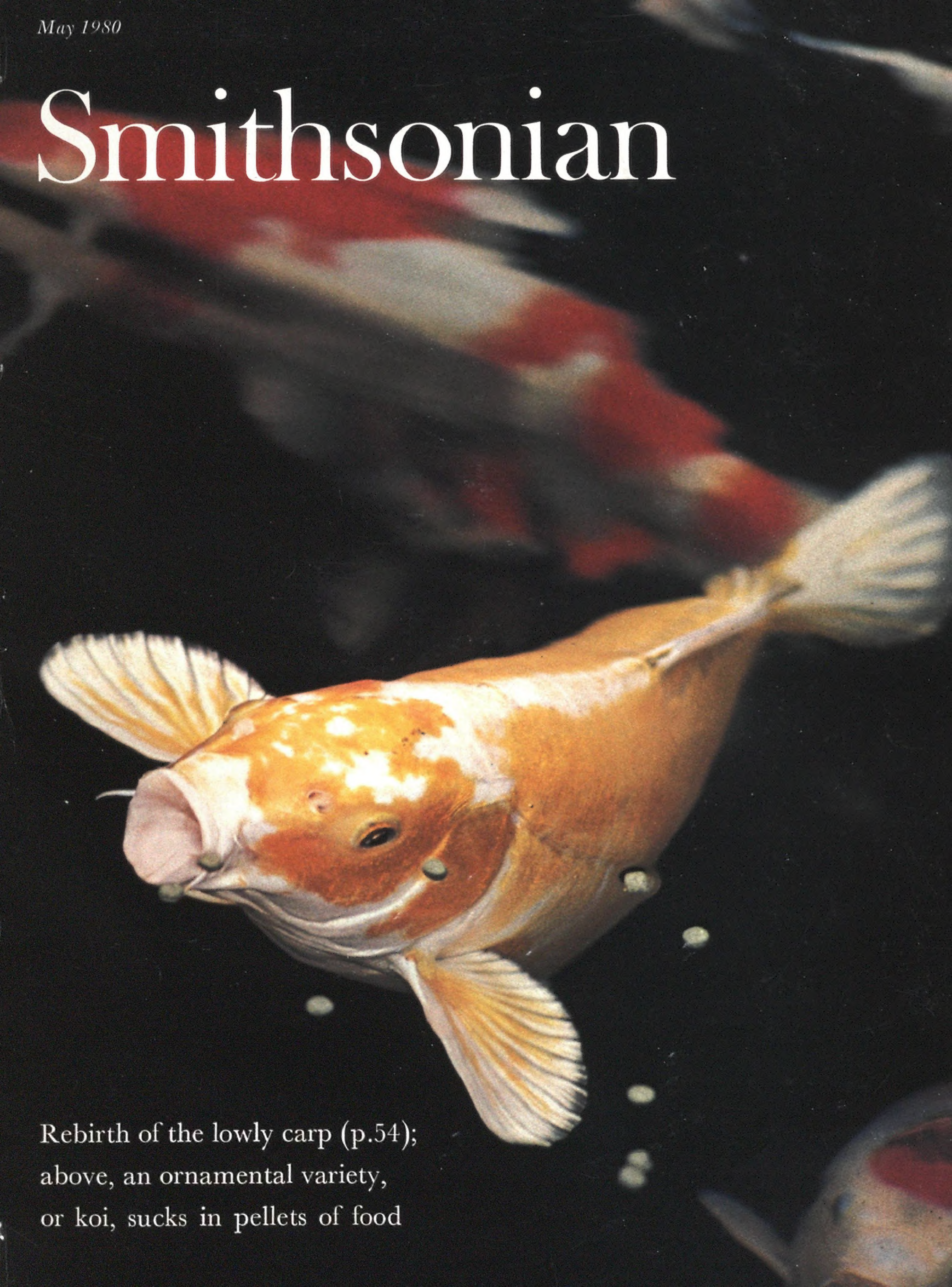
May 1980

Smithsonian



Rebirth of the lowly carp (p.54);
above, an ornamental variety,
or koi, sucks in pellets of food

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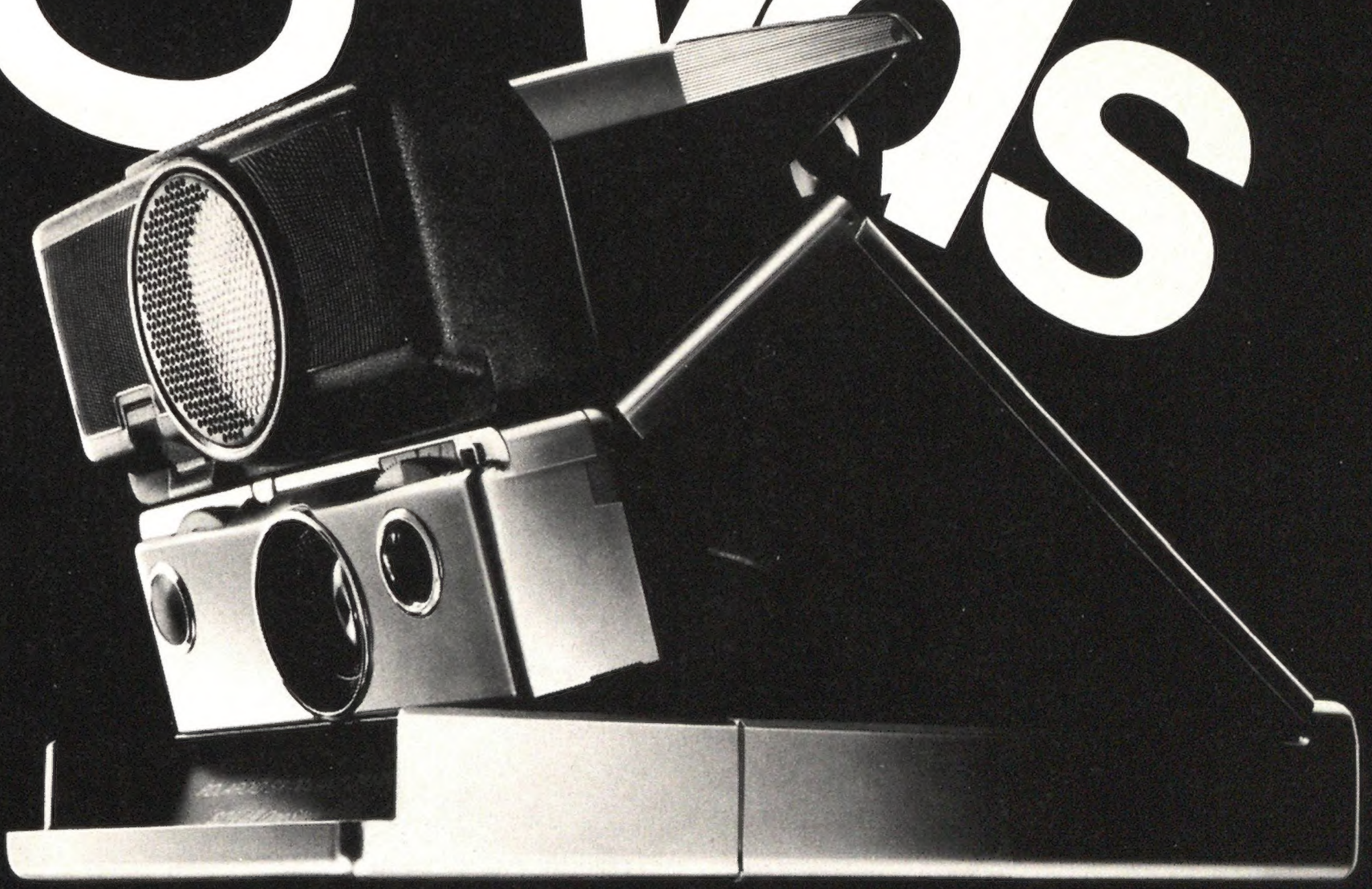

Polaroid's SX-70 Sonar

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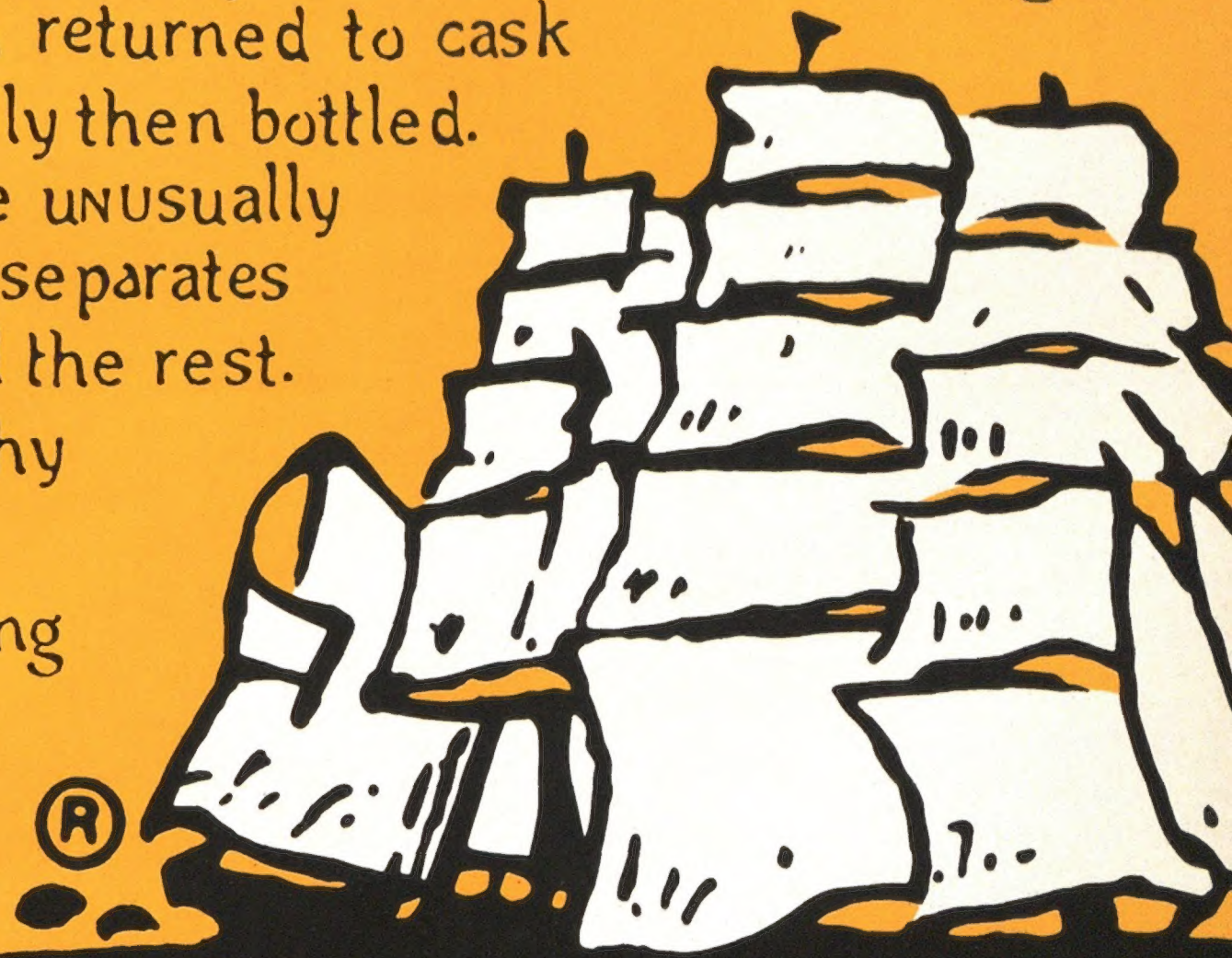

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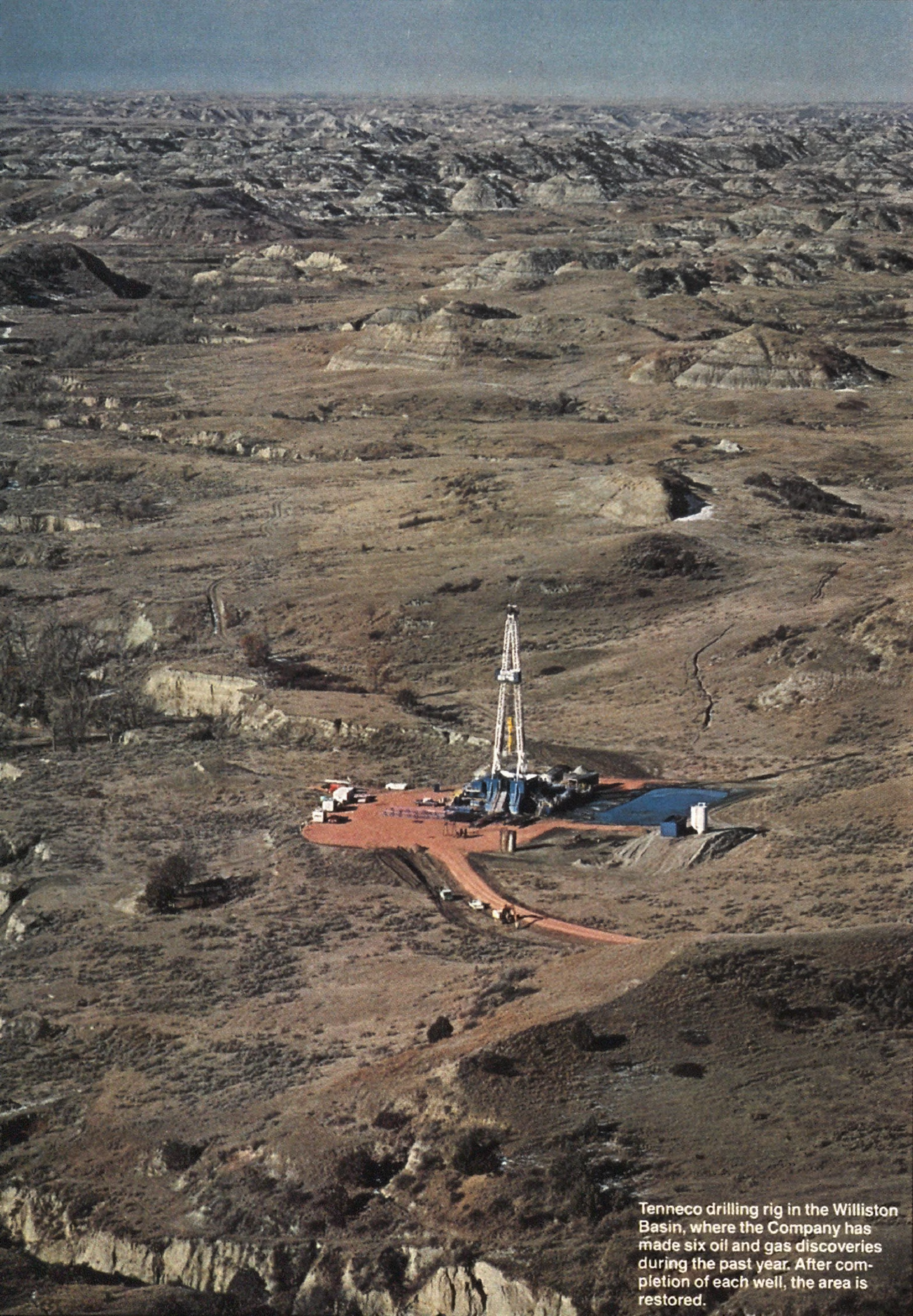

Tenneco drilling rig in the Williston Basin, where the Company has made six oil and gas discoveries during the past year. After completion of each well, the area is restored.

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Longer range, we're partners in a major oil-shale recovery project in Colorado and in a Louisiana project to recover natural gas from saline water in geopressurized zones.

We are making progress in our efforts to bring in additional natural gas from Canada and are already pipelining gas from Mexico. In addition, we are participating in a program to build the nation's first commercial-scale plant that will convert coal to synthetic natural gas, and are working to import liquefied natural gas.

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Secretary Ripley's comments

The view from the castle

What do people get out of a visit to our museums? More and more, it seems, they are looking for an educational experience

The greatest secret of a museum is not what's behind the scenes or what the exhibits are made of ("are the animals real?"), but what the visitors are thinking. It has always seemed to me that the awakening of interest is the most crucial and most elusive aspect of education. As I once said in a book of mine, "If the education industry does not create people who are interested in the world about them during one single life, then education is, above all, a failure."

Some years ago our Assistant Secretary for Museum Programs, Paul Perrot, and I thought that we should attempt to find out, without self-conscious opinion surveys and overt probing, what reactions people had to the museum experience. So we set up a study to find out the impact of an exhibit hall.

One of the interesting results was the categories of visitors discovered by our research team. They found that visitors divided rather readily into the following types: the "Commuter," someone who merely passed through the hall in order to get somewhere else; the "Nomad," who wandered in without specific direction but apparently open to the possibility of becoming interested; the "Cafeteria Type," who expected to find something of interest and could pick and choose; and, finally, the "VIPs"—the "Very Interested Persons," as our psychologists, Robert L. Wolf and Barbara L. Tymitz, described them.

Working in one of the exhibits of the Museum of Natural History, the hall of the Ice Age Mammals and the Emergence of Man, the researchers soon found certain basic principles. Pairs of persons seemed to get more out of the exhibits than individuals or large groups. And the overall number of persons in the hall affected the attention and the messages derived by the visitors. An empty hall stimulated people to go through quickly; with a very crowded hall, people got distracted and they had a short attention span. However, there was an optimal number of people—in the neighborhood of 50 to 75—which encouraged the visitors to assume a measured pace. As a result, they took time—especially at the entrance—to read the introductory material and get the drift of what they were to see.

People liked size. They were attracted to the giant ground sloths, the woolly mammoth and the mastodon skeleton. They photographed them often. "They're so big!" they would explain. They were obviously fascinated by the sense of human chronology, the association of Neanderthal cavemen with the extinct mammals, the strange burial scene of the fur-clad people.

The "Commuters" didn't gather many impressions —"I was just passing through." "Nomads" were a little better—"I watched the slide show on glaciers, but I couldn't tell you much more about it." The "Cafeteria Types" had lots to say, and the "Very Interested Persons" even more. What these answers tell us is that most large numbers of people who visit museums today want to interact with the exhibits themselves. They do read labels, and they do respond to objects.

This has been a confirmation of what most curators believe in today: the public wants to learn, and museums can help them. These experiences heighten our impression that museums are increasingly thought of as a tremendously valuable part of education.

S. Dillon Ripley

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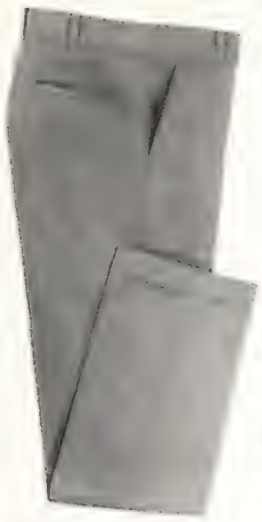

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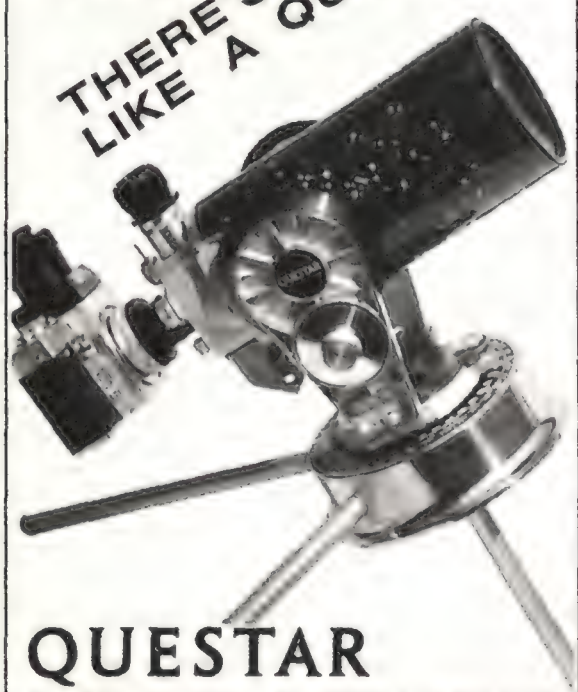

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Letters to the Editor

Tenth anniversary issue

Dear Sir: What a beautiful tenth anniversary gift your March issue was with its marvelous 120 covers! Thank you for the beauty, information and joy you provide in your wonderful magazine!
Julia G. Merrell
San Francisco

Dear Sir: Congratulations on your tenth anniversary issue. It was nice looking over the past covers and recalling many of the articles that brought me so much pleasure during the years.

I usually pass the magazine to my local library, but this issue is going to find a place on my own library shelf.
Thomas E. O'Brien
Arlington, Virginia

Dear Sir: I always knew that the SMITHSONIAN covers I'd been seeing were good, but to see all of them in one edition was breathtaking. Thank you for a marvelous, to be remembered, experience.
James R. Root
San Antonio, Texas

Dear Sir: My thanks to Edwards Park for his funny description of the birth of our magazine and for sharing those early days. I chuckled, giggled and outright roared with laughter the further I read.

Not only did hard work and an ability to cope with the impossible ensure SMITHSONIAN's success, but also the delicious sense of humor retained by the staff members enabled them to triumph over all the obstacles.
Anita Nilson
Craryville, New York

Dear Sir: I have been trying to uncover the cover in your tenth anniversary issue. Could it be that the American public is confronted with another cover-up from Washington? I have looked at the cover, looked under the cover and behind the cover but I overlooked the cover. Finally, I was able to uncover the cover for the March issue in the bottom right-hand corner of the back cover.

I am sure that if you come forward and confess the error of your ways, your subscribers will forgive and forget and continue to consider your publication an unimpeachable source of special information and pleasure.
Henry J. Flippo
Kansas City, Missouri
We are glad that reader Flippo discovered the picture (of Venice, California, roller skaters) that would have been our March cover had we not done all the other covers. And we trust that this covers the matter. Ed.

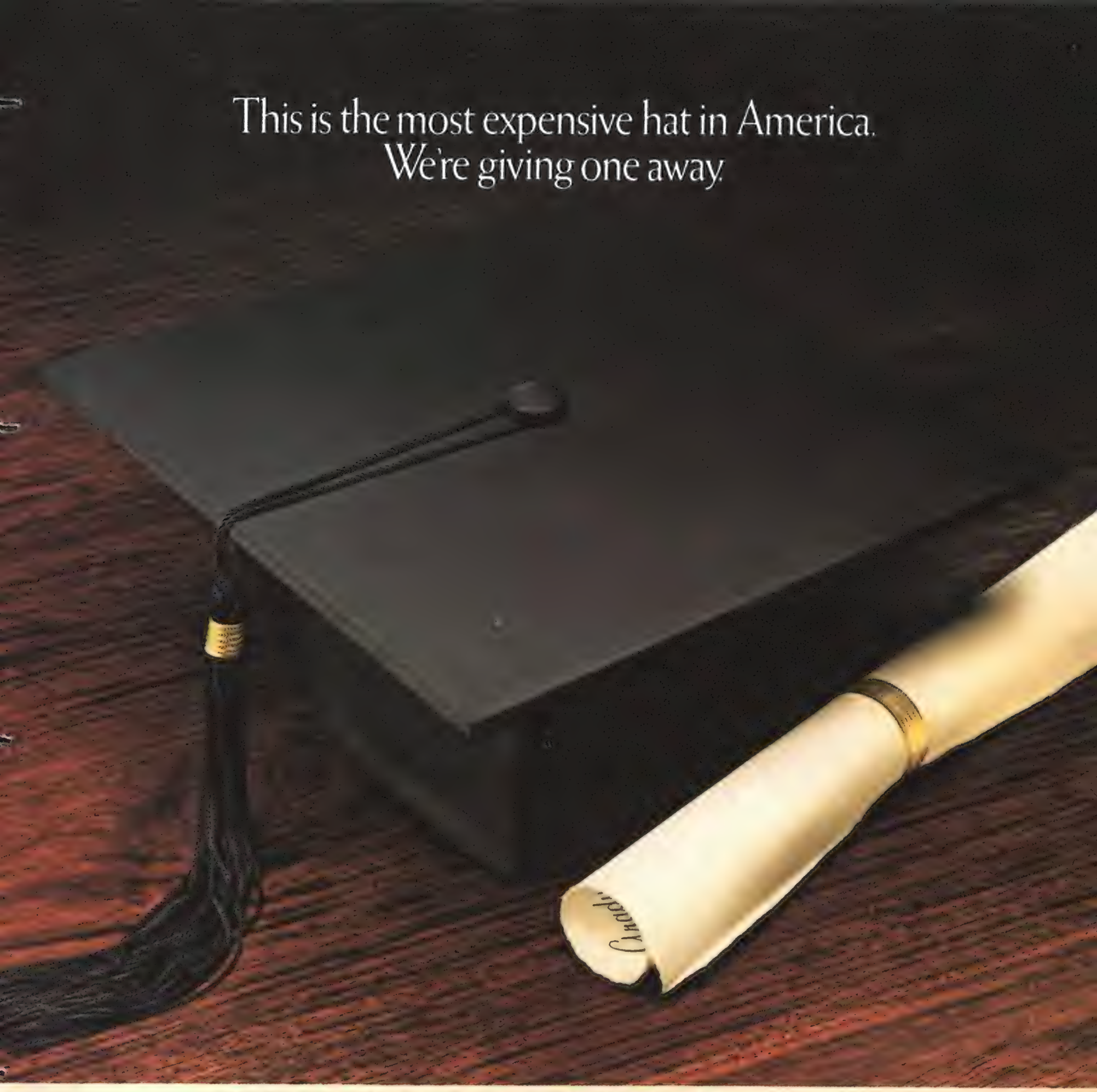
Battle over synfuel plant

Dear Sir: I was very much pleased to read Michael Parfit's article on the resistance to locating a synthetic fuel plant in McCone County, Montana. It is very important that people across the country realize that if we get together we can institute sound energy practices ourselves.
Philippa Proulx
Afton, Virginia

Dear Sir: I wish victory to the opponents of synfuel plants, such as Charlie Yarger and Tom Breitbach. Their backyards contain more energy than the coal interests want to admit, but not in coal. Charlie Yarger's wind could be harnessed and Breitbach's grain is an inexhaustible source of power and food.
Michael A. Brooker
Alexandria, Virginia

Dear Sir: As the father of two boys who may be asked to fight and die for America's precious energy sources, I read with considerable interest your article on how a couple of hundred people are preventing us from using vast coal resources here in our own country, in Montana.

When the time comes for my boys to risk their lives, I hope they are sent to fight in Montana and not the Persian Gulf. I think they could capture the



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Official Rules 1. To enter, fill in the official entry form—clearly hand printing your name, address and the answers requested in all three statements (or on a 5" x 8" plain piece of paper clearly hand-print your name, address and answers requested in the three statements on the official entry form). The answers to these statements may be found by looking at the labels of any bottle of Johnnie Walker Black Label Scotch Whisky. Labels may be obtained by requesting same from: Labels, P.O. Box 333 Pound Ridge, NY 10576. Bonus phrase may be found on game board displays in all participating restaurants or liquor stores or by writing to: Bonus Phrase P.O. Box 999, Pound Ridge, NY 10576 **2.** Enter as often as you wish, but each entry must be mailed in a separate envelope no larger than 4-1/8" x 9-1/2". Mail to Johnnie Walker Black Label Contest. P.O. Box 5525. New Canaan, Conn. 06842. Entries must be postmarked by June 23, 1980 and received by June 30, 1980. **3.** Winner will be determined in random drawings from among all correctly answered and eligible entries conducted by V.I.P. Service, Inc., an independent judging organization whose decisions are final, and will be notified by mail. **4. Grand Prize:** The cost of a four year college education for the winner's child or anyone the winner chooses, up to a limit of $30,000 in cash to be paid in one sum or, $1,875.00 quarterly per year over a period of four years. **Bonus Prize:** $10,000 in cash to be used (if so elected by the winner) toward the cost of a college education for the winner's child or anyone the winner chooses. The prize winner will be required to execute an affidavit of eligibility and release granting to Somerset Importers, Ltd. the right to use winner's name and photo in publicity **5.** Prizes are non-transferable—NO correspondence will be entered into. The odds of winning will be determined by the number of correctly answered entries received. Both prizes (valued at $40,000) will be awarded. Local, state, and federal taxes, if any, are the responsibility of winner. **6.** Contest open to residents of the United States. Employees and their families of Somerset Importers, Ltd., their advertising agencies, liquor wholesalers and retailers, and V.I.P. Service, Inc. are not eligible. Contest void in Pennsylvania, Utah, Texas, Ohio, and wherever prohibited or restricted by law. All federal, state and local laws and regulations apply. **7.** ENTRANTS MUST BE OF LEGAL DRINKING AGE UNDER THE LAWS OF THEIR HOME STATE AS OF MAY 1, 1980 **8.** A list of winners will be available, two months after the close of the contest, to anyone who sends a stamped self-addressed envelope to: Johnnie Walker Black Label Winners List, P.O. Box 666 Pound Ridge, NY 10576. Please do not send entries to this box number. **9.** The Official Entry Form may not be reproduced. NO PURCHASE REQUIRED.

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I certify that I am of legal drinking age under the laws of my home state as of May 1st, 1980.

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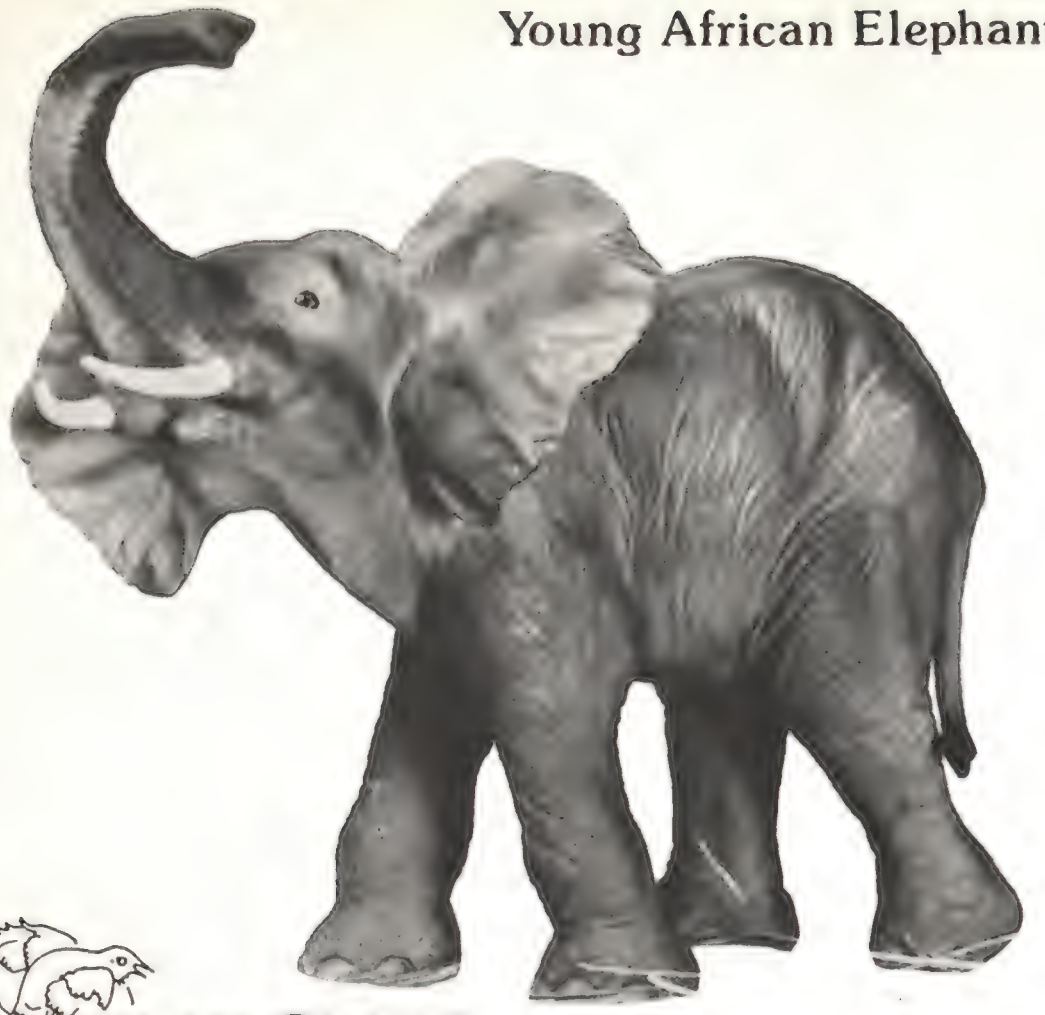

Young African Elephant

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Montana coalfields with less resistance and less chance of getting killed than if they were required to face Russian armed might on the other side of the world.
George B. Murphy, M.D.
Marion, Illinois

Dear Sir: This country may go down the tubes in the next few years because of the cost of importing oil from the OPEC nations. There is *one* way to avoid this fate—namely to build coal-to-oil plants as fast and as furiously as we can. The technology for doing this was developed by Germany in World War II, and South Africa is using the process now.
W. S. Skeen
Hornbrook, California
The Germans, using the Bergius process of coal liquefaction, produced up to 90 percent of their peak wartime aviation and motor fuel supply. For the past 35 years, this particular process has not been used, and the technical know-how seems to have been lost. In 1955 South Africa began operation of a coal liquefaction plant called SASOL I. With the use of this technology, it is capable of producing several thousand barrels of oil daily, but there are some emission problems which might not be tolerated here in the United States. Ed.

Dear Sir: It seems to me that we should be aiming at basic facts instead of lining up on one side or the other of new technological programs. In other words, I think Burlington Northern and McCone Agricultural Protection Organization must learn to talk to each other without creating new obstacles in the form of laws and court decisions. Otherwise, I am afraid, Mrs. Helen Waller's victory may turn out to be Pyrrhic, at best, and even worse than that for the rest of us.
Charles E. Sweeny
Seneca, South Carolina

California's Venice

Dear Sir: Charles Lockwood, in his article "Wheels and deals keep California Venice spinning," was in error when he reported that Helen Hunt Jackson, author of *Ramona,* appeared at the 3,500-seat auditorium in 1906. Actually, she died August 12, 1885 in San Francisco.
Carl R. Welshans
San Diego, California

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Dear Sir: It is unfortunate that Mr. Lockwood did not stroll the boardwalk on a Friday evening when he might have observed 200 young Jews welcoming the Sabbath a few yards away from the Israel Levin Center. The boarded-up old synagogue was reopened two years ago, and is now affectionately known as the "little old shul on the beach." It has become the focus of a deeply religious and traditional community, with the once-forgotten elderly linking arms with young professionals rediscovering their Jewishness in a warm atmosphere of prayer and confidence in the future of our home—Venice.
Rabbi Daniel E. Lapin
Santa Monica, California

Picasso

Dear Sir: It was with great delight that I read Pierre Schneider's article on Picasso. It reminded me of some revealing inner thoughts of the Master as they appeared in a French magazine: "The refined, the rich, the professional do-nothings, the distillers of quintessence desire only the peculiar, the sensational, the eccentric, the scandalous. And I, since the advent of cubism, have fed these fellows what they wanted and satisfied these critics with all the ridiculous ideas that passed through my head. The less they understood me, the more they admired me! Through amusing myself . . . I became celebrated and rich."
Hans W. Hamm
York, Pennsylvania

Census

Dear Sir: Your census article was a reminder that in 1824 New Jersey's records were destroyed by fire—a tragic loss because census records are of inestimable value to genealogical research.

It was not until the 1850 census that all household members were listed by name and occupation. In that year's records for Warren County, Ohio, one census taker wrote by the name of a young woman: "the prettiest girl in Warren County."
William M. Seaman
Wheeling, West Virginia
Census records were so open in the early days that the results were posted in taverns, but after the 1910 census confidentiality was the policy. Finally, in 1978, a law was enacted to safeguard records for a period of 72 years. Ed.

OLYMPUS ANNIVERSARY
50
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Maitani

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Computers

Dear Sir: Richard M. Restak's article on the sophistication of modern computer technology should contribute greatly to lay understanding of this technical marvel. However, his parenthetical sentence is in error: "(Computer simulation of the May 25, 1979, Chicago air disaster in which 273 persons died, for instance, revealed that even the most experienced pilots would not have been capable of altering events, given that particular DC-10's structural defects and malfunctions.)" It is our opinion that some pilots could have flown that aircraft had the crew recognized the onset of the stalled condition which led it to crash. There were no "structural defects," a fact established in detailed and costly investigations directed by the National Transportation Safety Board and the FAA.

All "malfunctions" of that DC-10 were the result of catastrophic damage caused when a wing engine pylon, which had been damaged during a maintenance procedure that was contrary to the manufacturer's specific recommendations, tore loose from the wing under the 40,000-pound thrust of the engine.

J. L. Cooke, Deputy Director
Douglas Aircraft Company
Long Beach, California

Alcock and Brown

Dear Sir: I enjoyed the article on the daring nonstop flight to Ireland by Jack Alcock and Teddie Brown, and would like to fill in some details that I observed as a messboy on the SS *Lake Charlottesville* in the 1919 rescue of the Hawker-Grieve Sopwith in mid-Atlantic.

The wireless SOS, "Look out for Hawker," reached us in the evening and watches were set bow and aft. The empty plane was sighted and, after two hours of work, it was hauled aboard.

About a week later, our ship entered Falmouth, and the plane was taken off by the Royal Navy for exhibition in a London store. I believe your picture of the ditched plane was taken from our deck. (Earlier the men had been rescued by a Danish freighter, the *Mary*.)

I am 81 plus, a foreign missionary and now retired after 25 years of teaching and preaching on four continents.

James Ryan Hughes
Maryknoll, New York

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PONTIAC TAKES ON THE IMPORTS

GRAND PRIX vs. TOYOTA CELICA GT LIFTBACK AUTOMATIC

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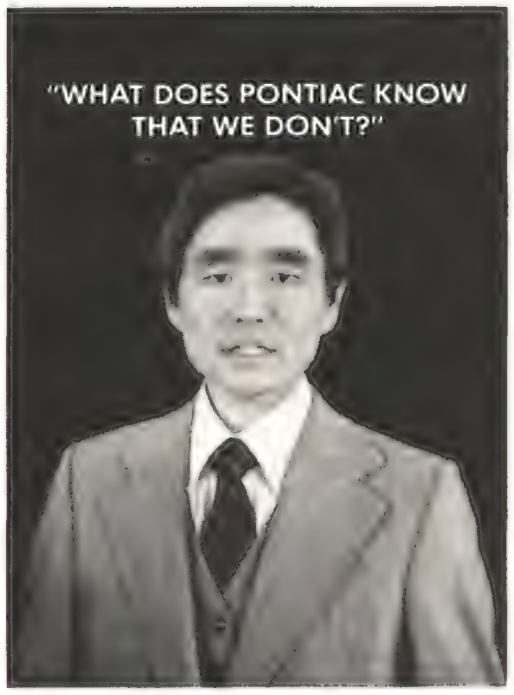
A new six-passenger Grand Prix is priced at just $6448, while the smaller Toyota Celica GT is priced at $6919. This base car comparison of manufacturer suggested retail prices includes automatic transmission and dealer prep. Taxes, license, destination charges and available equipment additional. Destination charges vary by location and affect comparison. Level of standard equipment varies.

GRAND PRIX OFFERS THE SAME EST. MPG, BETTER HWY. EST.

Grand Prix and Celica GT both rate an impressive (20) *EPA EST. MPG.* But



Grand Prix's HWY. EST. of 27 is one mpg better than the Toyota's.

GRAND PRIX GOES FARTHER ON A TANK OF GAS.

Multiply Grand Prix's (20) *EPA EST. MPG* by its 18.1 gallon fuel tank and you'll see Grand Prix has an estimated range of 362 miles. While Celica GT's smaller 16.1 gallon tank gives an estimated range of only 322 miles. Remember: Compare the "estimated mpg" to the "estimated mpg" of other cars. You may get different mileage and range depending on how fast you drive, weather conditions and trip length. Actual highway mileage will probably be less than the estimated highway fuel economy. Mileage and range estimates lower in California. Grand Prix is equipped with GM-built engines produced by various divisions. See your dealer for details.

Add it all up and see if you don't agree Grand Prix is the winner. At your Pontiac dealer's now.

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Remember, your reservation for this advance offering must be postmarked no later than May 31, 1980, in order to be guaranteed acceptance. To avoid disappointment, reserve your collection today!

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The Beauty of Fine Porcelain.

The Magic Moments of Childhood Plates will be crafted of fine Bavarian porcelain, treasured the world over for its translucence, whiteness, and strength. The tradition of Bavarian porcelain is one of the oldest in Europe, going back over two and one half centuries. The creation of a collection of such quality would be impossible without the specialized knowledge and time-honored craftsmanship that only a few master porcelain makers possess.

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Strictly Limited Edition.

The Magic Moments of Childhood Plates will be issued in a strictly limited edition available exclusively from the Danbury Mint. No plates will be sold separately and none will be made available in stores. The attached reservation application is guaranteed acceptance only if postmarked on or before May 31, 1980. A further public offering may be made later this year, and the size of the U.S. edition will be forever limited to the exact number of subscriptions reserved by the final deadline.

X-13

RESERVATION APPLICATION

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Phenomena, comment and notes

Two pigeons ape the apes, mosquitoes rush in where the elephants tread, and potholes that bloom in the spring

Even spring, which it happily now is, can have its drawbacks. For highway departments it is the time to undertake the Sisyphean task of repairing the potholes of winter—that is, if the municipality has any funds for such frills.

I don't feel sorry for highway departments; they make the potholes worse by their actions in winter. They put salt on the roads. Roads made of steel-reinforced concrete do not take kindly to this treatment. Salt seeps into the wet concrete and hastens the rusting of the steel rods. The rust, says *SciQuest* (Vol. 53, No. 1), "grows" and eventually splits the pavement. (Salt, while we are at it, rusts your car, ruins your shoes, irritates tender dog paws and, if ingested in immoderate quantities, may be bad for your blood pressure. I say to hell with it.)

More precisely, salt dissolves in the water of a wet highway, creating brine through which electric current can flow. The process of rusting (oxidation) is the result of electrons flowing from one place to another, that is, from an anode to a cathode. The brine facilitates the flow.

Technological bothers are, it is said, best fixed by more technology, and one fix is being tried by some highway engineers in our northern states and Canada. Their approach is to bury their own anodes in slots in the road. A special grout distributes a trickle of direct current to the steel reinforcing rods, turning the rods into a cathode, thus closing the circuit and ending corrosion.

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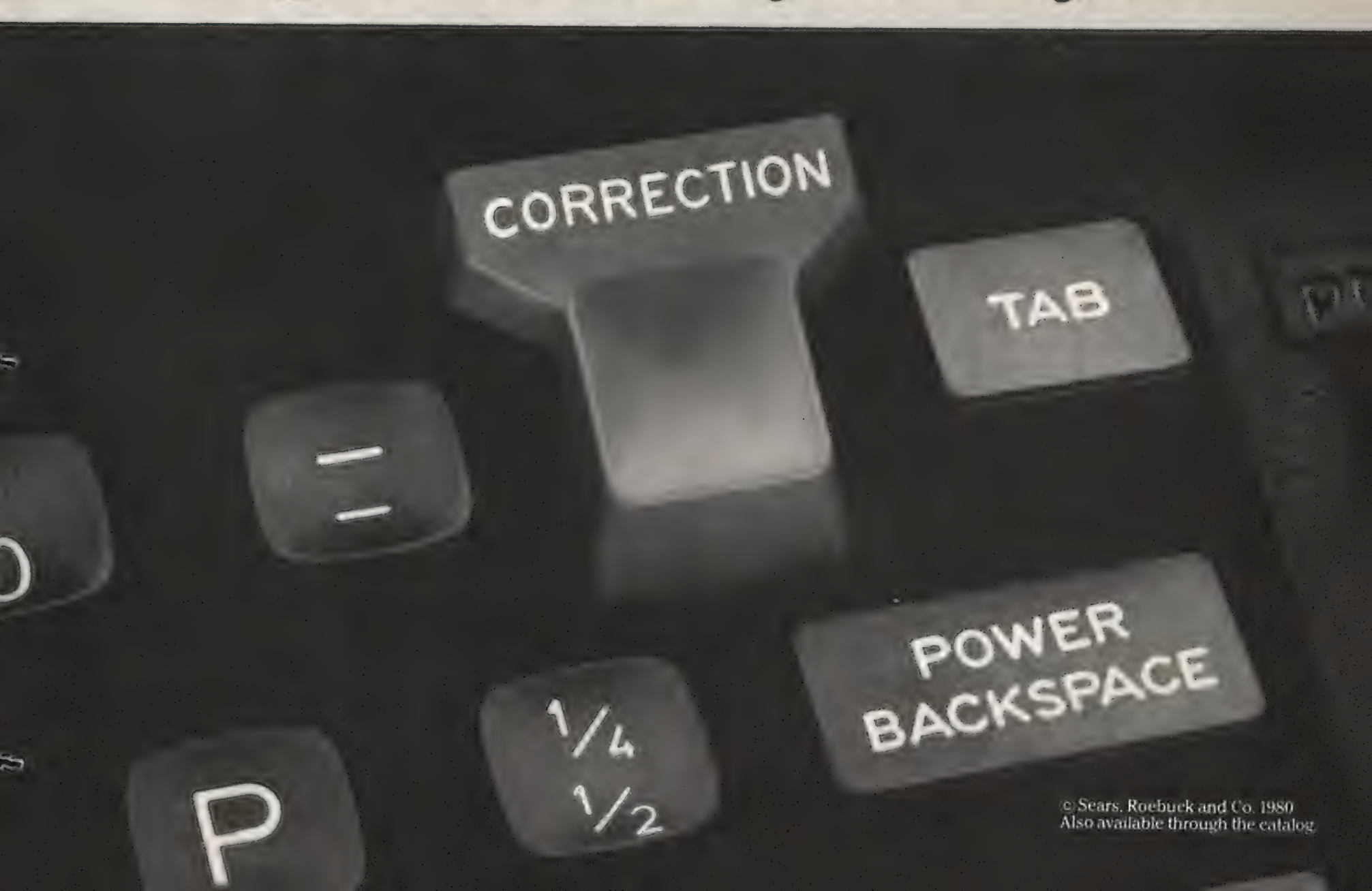

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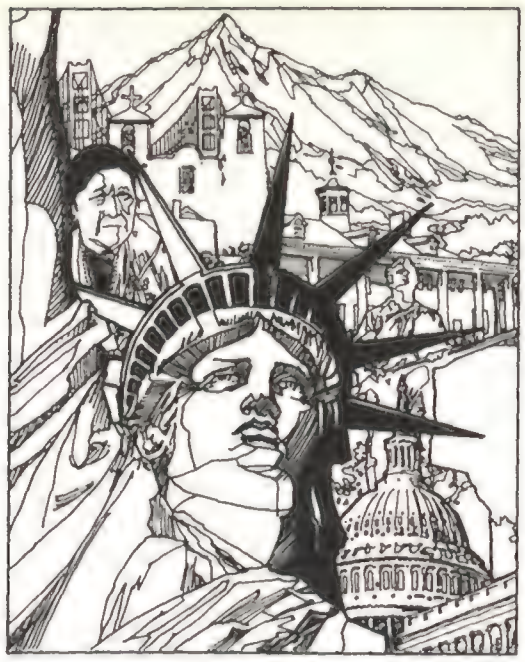

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Critics, who worry about the expense of all this, suggest sealing the top of pavements with a layer of latex-treated concrete, which sounds pretty expensive too.

It wasn't *all* that many decades ago when, I can recall, they didn't salt the roads, even in the North. If the roads were too snowy or icy, you simply called your nearly deserted office to say you couldn't make it. It didn't seem to hurt the GNP one bit.

Cyrano de Narwhal

To take your minds off the hassles of spring, there is the more romantic side of science to consider. According to two marine scientists at McGill University who went to Baffin Island three times to look into the matter, the narwhal (SMITHSONIAN, February 1980) uses its mysterious, unicornlike tusk for uncommonly chivalric purposes. Reporting in *Nature* (Vol. 284, No. 5751), they say there is a rapid spurt of tusk growth when the male narwhal reaches sexual maturity. Narwhals also seem to have a lot of scars on their faces, especially the older males. And there are reports of narwhals crossing tusks above and below water. The two scientists suggest, from all this, that mature males "duel" over the right to females. The narwhal tusk, then, is a sword for romantic combat.

Male narwhals cross tusks above water in a "duel" for a female's attentions.

But the rewards of love's labors must be relatively short-lived in narwhal-land. More than 60 percent of the adult males sampled had the tips of their tusks broken off.

Tracking down a new species

Talk about limiting your options, there is a mosquito that takes the prize this

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— JOHN RAY, ENGLISH PROVERBS, 1670

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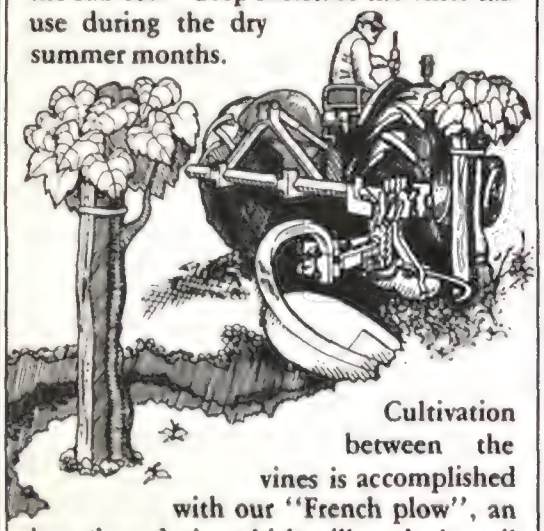
Cultivating the Vineyard

10 An important chore each spring is grooming the vineyard floor. We begin as soon as the upper soils dry out from the long winter rains, first by mowing the wild growth of grasses, mustard plant, morning glory and other weeds. If allowed to continue, this growth would rob the soil of nutrients and moisture needed by the vines. This natural, organic mulch is then turned under by discing between the rows. Discing continues until the surface soil is of a powdery consistency. This creates an "air barrier" that slows evaporation of moisture from the sub-soil – deep moisture the vines can use during the dry summer months.



Cultivation between the vines is accomplished with our "French plow", an ingenious device which will work the soil to within four inches of a vine's base without damaging it. A "striker bar" on the plow strikes each vine and automatically swings the blade to one side until the vine is passed. This plow is used only with mature vines, however. Our young vines are tended carefully, by hand, with a hoe.

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month. Scientists at the Smithsonian's National Museum of Natural History have recently identified a brand new species of mosquito, calling it *Anopheles dirus* because it is a major malaria transmitter in Thailand. (It's nothing, folks; our people have identified some 125 new mosquito species in 15 years.) What gives this mosquito the specialization award is its curious reproductive habitat: rain-filled elephant footprints in forests.

Among lions, loners finish last

The way they used to teach us about evolution, a dog-eat-dog world of me-first-ism to get my genes out there ahead of yours, there didn't seem to be much place for cooperation or charity.

At least among lions, it turns out, cooperation does pay. This news comes from three zoologists at Cambridge University who announced it in *Nature* (Vol. 282, No. 5741).

A pride of lions in East Africa generally consists of some six (plus or minus) related females and their cubs. Males come and go, and the nature of the comings and goings is the point. Male cubs leave the pride "as a group of relatives" before sexual maturity and, in coalition, seek out a pride to take possession of, booting out the other males. You would expect, putting yourself in the place of a male lion, that if you were by yourself and confronted with a comely pride in the possession of two male lions, you'd have a heck of a time getting rid of the other two. And if, by some miracle, you did so, and then three big male lions happened to come by, your pleasures would be short.

The Cantabrigians adduce statistics from many years of observation in the Serengeti and the Ngorongoro to show your expectations are right. Only 4 of 23 lone males had a pride; 23 of 39 pairs did so; and 20 of 21 large groups (3 or more males) possessed prides. These large male groups also retained their prides longer—about 2.5 times longer. In fact, after 2 years of possessing one pride, large male groups occasionally would take possession of another pride as well.

The scientists detected no hierarchy among the males; all made out equally well, as it were. Thus, groups of brothers and male cousins were perpetuating a whole mess of fairly common genetic material, while loners were losing the race—

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Advance subscription deadline: May 31, 1980.

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To create the original work of art that will be depicted upon each of these thimbles, Franklin Porcelain has commissioned the outstanding wildlife artist Helen Hall. She has portrayed each butterfly . . . and each flower . . . in the most intricate detail and the most realistic color. The beauty of every one of the fifty butterflies is magnificently expressed.

Among them are New York's Tawny Emperor, conspicuously elegant against a background of Sea-Pinks. The distinctive Eastern Tiger Swallowtail of Indiana, hovering among a cluster of St. John's-Wort. California's Green Comma, displaying its beauty in front of that tiny orchid of the marches, the Fairy-Slipper. Altogether, fifty lovely butterflies, each portrayed with a flower typical of the region.

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To subscribe, please mail the application below by May 31st. Others may be given the opportunity to acquire the collection later. But, at the end of 1980, the edition will be permanently closed.

Thimbles shown actual size—approximately 1⅛ inches in height

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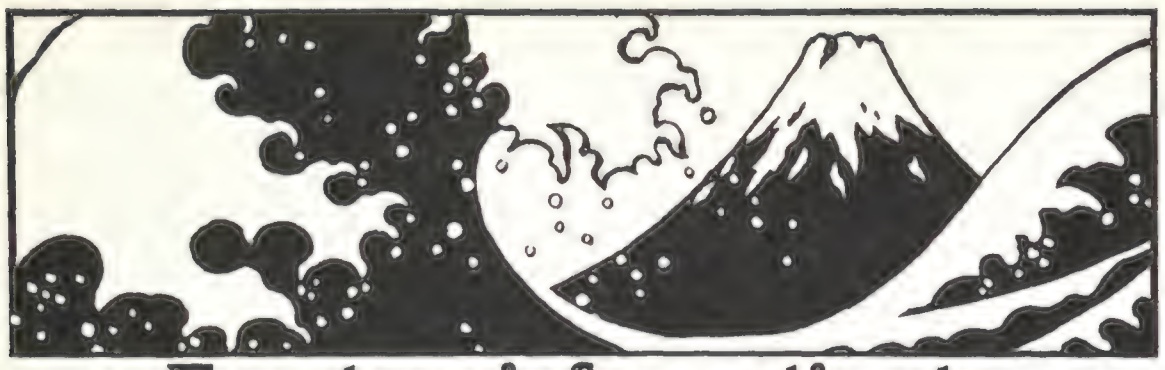

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Birds talk to B. F. Skinner

Having a parrot that says "hello" when I come home, "bye" when I leave and, often, "time for a drink" when I am thirsty, it is pleasant to imagine that birds are intelligent—but I know deep down they are not.

Deep in conversation, Jill answers a question (top); Jack thanks her (bottom).

Language, or symbolic communication, is alleged to be a sign of intelligence, so a report by the redoubtable B. F. Skinner and his associates at Harvard leaped at me from the pages of *Science* (Vol. 207, No. 4430). It claimed that birds—two White Carneaux pigeons—had learned to communicate by the use of symbols.

We've all heard about the chimpanzees who have apparently learned such skills, but *birds*? Professor Skinner used techniques similar to those followed by the Yerkes Regional Primate Research Center in Georgia (SMITHSONIAN, April 1979) and taught his two pigeons, Jack and Jill, to operate keyboards on which

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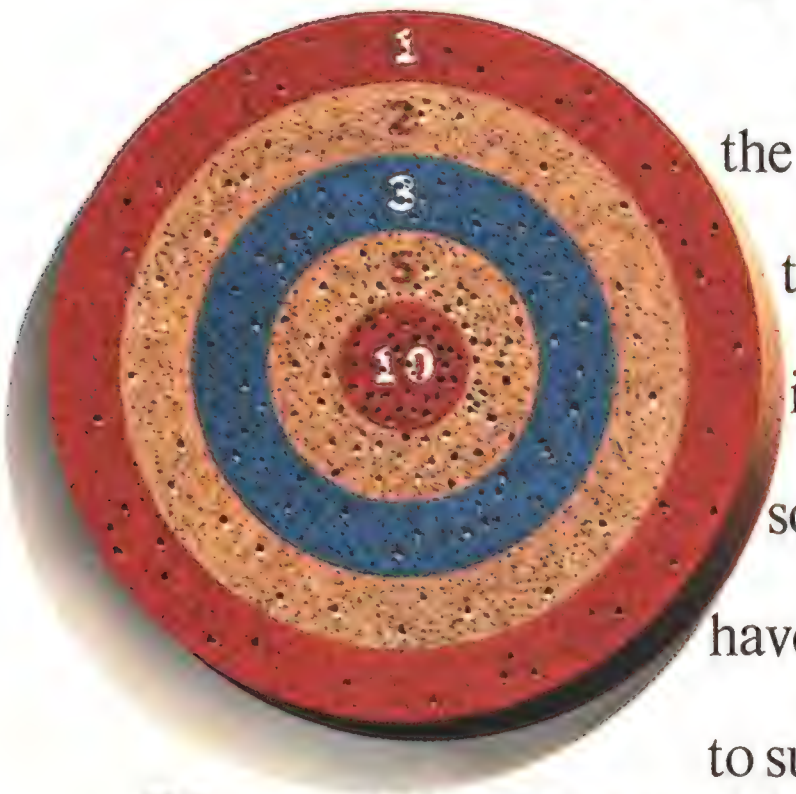

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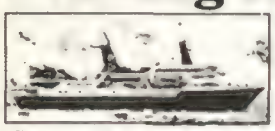

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symbols, representing different colors, were shown. After a good deal of training, Jack could ask Jill what color was hidden from him; Jill would peck the appropriate key for the hidden color; Jack would peck the "thank you" button, providing Jill with a snack; and then Jack would press his own key for that color and get his own snack. Thus, a "sustained and natural conversation," say Skinner *et al.*, tongue-in-beak.

What they really think happened was good, old-fashioned, classical (Skinnerian) conditioning response—not some linguistic ability in their lowly avian subjects. And they go on to suggest that the work with apes is the same thing.

Irked, the people at Yerkes have complained, according to *Science News* (Vol. 117, No. 6). The pigeons may have been operating out of conditioned responses—their keys' positions, for example, were never moved. But in the experiments with apes, the keys were moved around to ensure that the apes were "reading" the symbols. So where are we?

"Time for a drink," suggests my parrot with characteristic precision.

—JAMES K. PAGE JR.

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With a sense of newsworthiness that can only be described as spooky, the Museum of Natural History came up with a display of raw gold exactly at the time when world gold prices were soaring. They soared so fast, in fact, that by the time the preview press conference was over, the price per ounce was considerably higher than when it began.

The crystalline gold in this display is remarkable. When gold-bearing rock is dislodged from the mother rock—usually by mining—the crystalline masses emerge, beautifully lacy, with delicate golden fingers reaching out to give the whole thing an almost fanlike shape. When such gold happens to find its way into a rushing stream, the rocks carried by the water hammer the crystals down, smoothing and rounding them into nuggets.

So the remarkable crystalline examples in the Smithsonian display set it apart. It's probably the finest collection of this form of gold anywhere in the United States. And the most extraordinary of these samples is one that stretches 13 inches. If you want to figure its current value, it weighs 57 ounces. It came from a mine in Tuolumne County, California.

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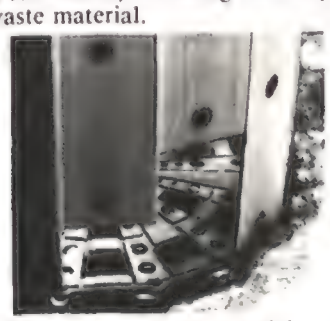

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Perhaps the most interesting thing about these chunks of gold is that some of them did not come from the usual gold-rush locales. Would you believe gold from Spotsylvania County, Virginia? Montgomery County, Maryland? How about nuggets from the Carolinas? Alabama? Sure, most of these pulse-raising discoveries date back several decades, but with prices the way they are now, you may wish to pack up your family, a pick and shovel and an old washbasin and head for them hills—in the East, that is.

I have a personal sympathy for such an urge because I once actually did this. Years ago I joined some fellow newspaper people in covering a small but rather exciting gold rush in the southern part of Australia. We found that the best way to get our feature stories was to get in on the action.

We bought the required miners' permits and set about staking a claim. The problem of finding exactly the right place might have stumped professional geologists, but we solved it brilliantly. We had taken rooms at a nice old country hotel with a good menu, a generous landlord and an unlimited supply of superb beer. It also had a broad, unused backyard. We secured the publican's permission, filed the claim, bought our digging equipment and set to work.

In 20 minutes our host appeared bearing a tray that sagged with the weight of many mugs and a foaming pitcher—on the house. So work stopped for a bit. And then a little later out came the tray again, this time our treat. And so on. By the end of that weekend we had sunk our shaft ¾ of an inch.

We had that claim for several months, and were finally persuaded, by greedy spouses who came out to the goldfields to put a halt to those trays, to dig harder and get some gold. And one cool, rainy day, when we had reached the quartz gravel layer, I was dutifully panning and suddenly among the tiny swirling pebbles in the pan was a flake of yellow that looked as large and glorious as the rising sun. Very carefully I transferred it from the pan to the aspirin bottle kept for this contingency. And it was remarkable how it shrank in size once it was on the tip of my finger. But it was gold, and my temperature rose like today's prices. There *is* a fever and I felt it. (For an earlier gold prospector, see p. 180.)

What your home could have in common with the Met, the Tate, and the Louvre

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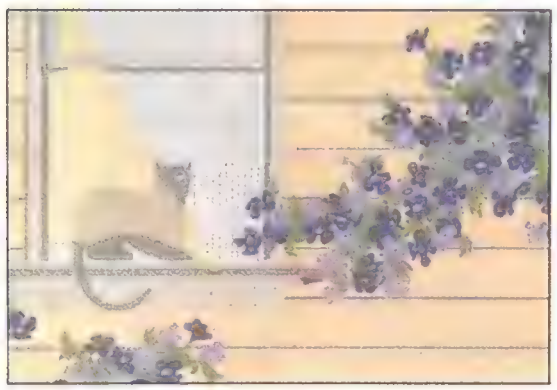

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Diana of the Tides, the massive painting which was discovered in the Museum of Natural History and which I wrote about in February, is clamoring for more attention. I said then that I knew nothing about the artist, John Elliott. I do now, thanks to some very nice readers who have managed to straighten me out.

John Elliott was an Englishman who married Maud Howe, daughter of Julia Ward Howe (*Battle Hymn of the Republic,* remember?). One of his first major jobs was a painting for the ceiling of the Boston Public Library—a scene from mythology like *Diana.* He already had done a ceiling for the Potter Palmer house in Chicago, the home of the millionaire who built the famed Palmer House Hotel.

I ventured that Elliott's style reminded me a little of Maxfield Parrish. Sure enough, the Elliotts went in the summer of 1903 to the informal art colony that had grown up around the sculptor Saint-Gaudens (p. 108) in Cornish, New Hampshire. Here he met and made friends with a number of creative people of the time, including young Maxfield Parrish, who was there with his father.

The Elliotts' acquaintanceship was broad and interesting: Charles Dana Gibson, Henry James, Carlisle, of course Larz Anderson who presented *Diana* to the Smithsonian. They were widely known

Artist John Elliott

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in Boston. Mrs. Jack Gardner, whose museum is still a choice spot, was a friend. And the president of the Boston Public Library Board of Trustees, who commissioned Elliott, was former mayor Frederick O. Prince. Not too long after their meeting, Elliott was to paint a wartime portrait of Prince's grandson, Norman, one of the young heroes of the Lafayette Escadrille (SMITHSONIAN, December 1972).

We have that Prince portrait, also the ones Elliott did of two other members of the squadron, Victor Chapman and Raoul Lufbery. They once hung in the World War I gallery of the National Air and Space Museum, when it was housed in the old Arts and Industries Building, and I used to look at them because the faces are young and brave and joyous.

John Elliott was always close to his famed mother-in-law. Since she lived in Newport, Rhode Island, he and his wife were well acquainted with that old town. Thus the establishment of the Newport Art Association was a natural step for them to make. One of my correspondents recalls seeing Maud Howe Elliott arriving at Newport functions—a grande dame.

By then John had died, too soon, in 1925. He was a good man, much loved. The Howe family still thrives, and I got much of my information about John from the book his widow wrote about him in 1930. She and two sisters also did a book about their mother that won a Pulitzer prize for biography.

I suppose it seems an outrageous step from Julia Ward Howe and her set to the Fonz, star of the TV show *Happy Days,* but that's the way it goes in this business. Fonzie, who is really an actor named Henry Winkler, whom all of us had better remember because he's a very talented guy, invariably wears a leather jacket in his TV show, which is really a very funny show, I think. Anyhow, the jacket now belongs to the History of Entertainment Collection at the Museum of History and Technology.

The donation was an enormous media event with flashbulbs going off like lightning and crowds of teen-agers in the museum hallways screaming in waves of frantic emotion whenever there was a hint of Mr. Winkler's presence.

He arrived at a crowded reception room looking like the nucleus of some violent atomic action. First, all you saw was the flashing of the lights; then the

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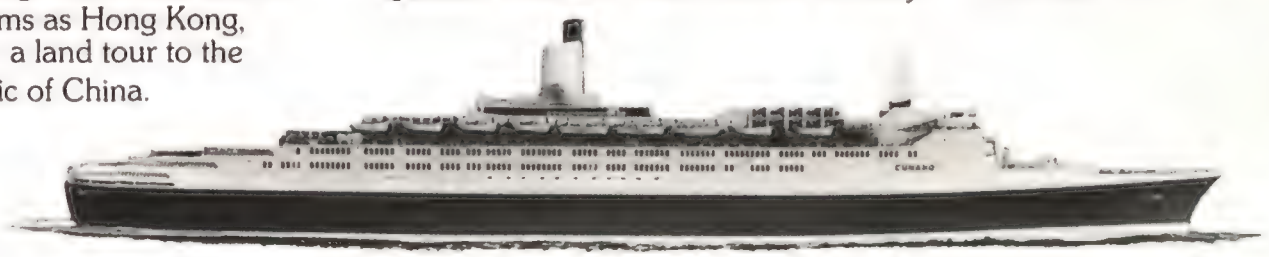

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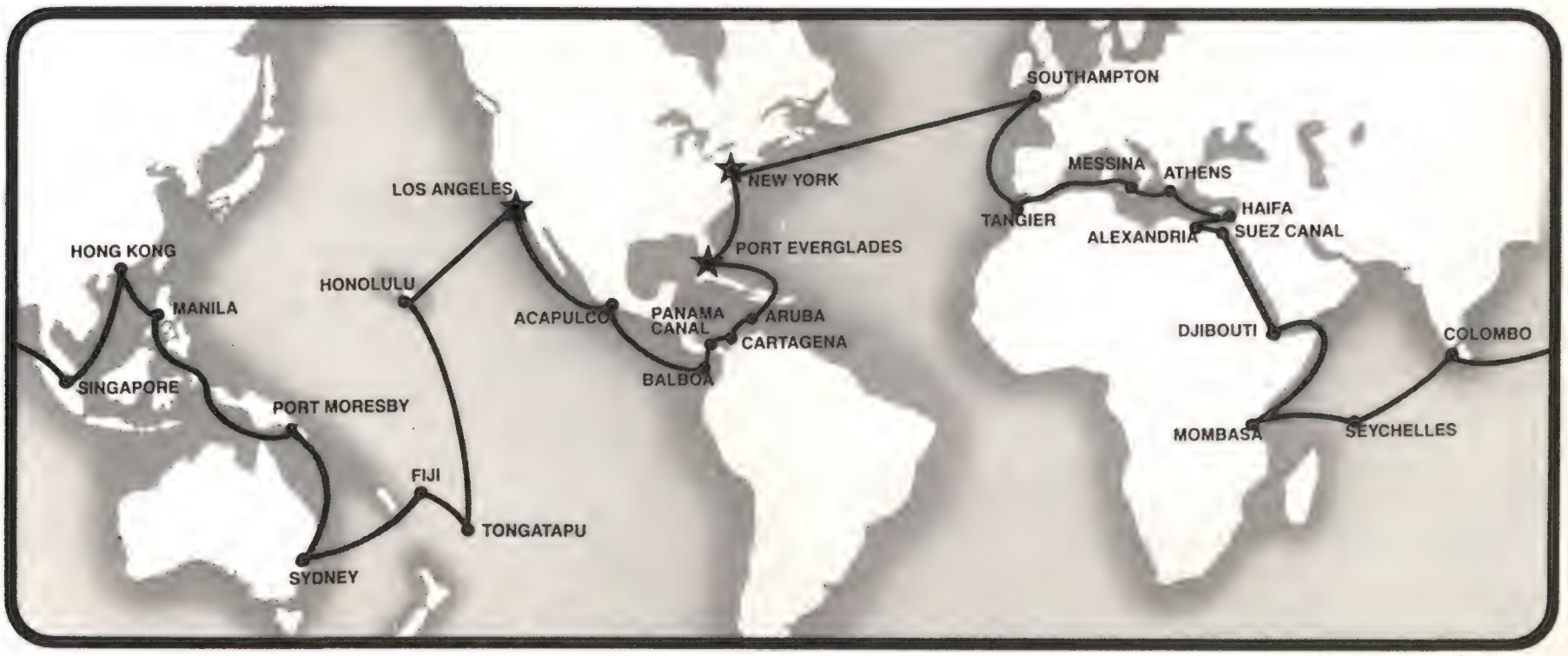

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Fonzie (Henry Winkler) and jacket.

screams rose to a crescendo; then there was a moving ring of cops with a harried-looking guy in the middle; then he was deposited inside the room, and one of the cops, passing me, said "Sheesh!"

Fonzie wore a sincere gray suit with a double vent, an Ivy League blue button-down shirt and a tie in Harvard crimson. His hair was longer than in the show and came across his eyes in a way that made him eerily resemble a friend of mine. He kissed every woman in sight, and a good many of the men, too.

He had a small cortege of show people with him. There was a man in a hounds-tooth jacket with two sets of pleats, one in front and one in back, and also very pressed khakis and shoes with hard heels that made a strong noise when he walked. There were others, too. There were some beautiful women and tall, attentive men who seemed to be in control of everything they looked at. There were lots of Smithsonian people trying to look as though they greeted TV stars every day, and there were guards and maintenance people who were having a ball and not pretending anything else.

Fonzie spoke about the show and his jacket and a little about himself. He was easy and funny and sort of endearing.

I had to leave early, and when I went out the door of the reception room a 15-year-old girl in the crowd shrieked at me "When is he coming out?"

I smiled the way one does when one knows the answers, and I said, "Soon!"

—Edwards Park

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By Percy Knauth

Seeking a solution to the danger of collisions in the crowded skies

Jets, commuter planes and private aircraft are filling up available space—but there's sharp disagreement over what to do about it

"Albany tower, this is Tri-Pacer Nine-Oh-One-Three Delta." At 2,500 feet above the broad and lovely Hudson River Valley, my voice travels by VHF radio to the airport still hidden somewhere in the bluish haze of summer ahead of me.

"Tri-Pacer Nine-Oh-One-Three Delta, this is Albany tower. Over."

"Albany tower, One-Three Delta is at 2,500 feet, southeast. Request landing instructions, please."

Back comes a clearance to enter the traffic pattern, then the runway number, the wind (light, variable, from the east), the altimeter setting (so that my altimeter, operated by barometric pressure, will coincide with theirs), and the time. I also hear the same voice clearing a Convair to land, and holding a four-engined Constellation short of the runway before take-off. My big, wide world shrinks perceptibly, and a small finger of apprehension chills my stomach. This is my first cross-country trip alone.

"Tri-Pacer One-Three Delta, this is Albany tower. . . . Say your position, please."

I think of those huge Convairs and Constellations, ascending and descending, and—bursting into the midst of them—Student Pilot Me. Then, ahead, I see an airfield. I quickly respond. "Albany tower, One-Three Delta. I seem to be coming up on you from the east. Do you have me in sight?"

"Negative, One-Three Delta. Where are you?"

Where? I'm right over this field, circling it at 2,500 feet. It has concrete runways, taxi strips, hangar, control tower and large, silver aircraft parked on the apron. But there's something wrong. Nothing down there is moving. The cold spot in my stomach is congealing into ice.

"Thirteen Delta." There is no hint of reproach or impatience in the friendly voice from the ground.

Followed by a 727 jet, which lands at 138 mph, a 16-passenger British-built Short Skyvan, which lands at 104 mph, approaches Los Angeles International. Controller's job is to keep them safely separated.

"You may be over Schenectady. Advise asking whether *they* have you in sight."

Hastily, I tune in the Schenectady frequency and call. Negative. They do not have me in sight.

"Thirteen Delta, Albany tower. Sir, are you on a solo cross country?"

Relief floods through me. Now they know, they understand. "Albany tower," I reply with feeling, "Yes, sir, I am."

"Thirteen Delta, advise us when you have located yourself."

The menace of the Convairs and Constellations fades. I check my map and the ground and think the problem through. I have mixed up my headings, just as my instructor undoubtedly expected. The field below is military. I turn away, follow the river and within five minutes see Albany ahead, one airliner taking off, another taxiing. A few minutes more and I am safely on the ground.

Twenty years have passed. The drone of One-Three Delta's faithful engine has long since been stilled. Some of her bigger contemporaries are museum pieces, and jets trace contrails across the sky. But the question I faced that day is more urgent now: should little airplanes, some with student pilots, use large commercial airports along with scheduled airliners?

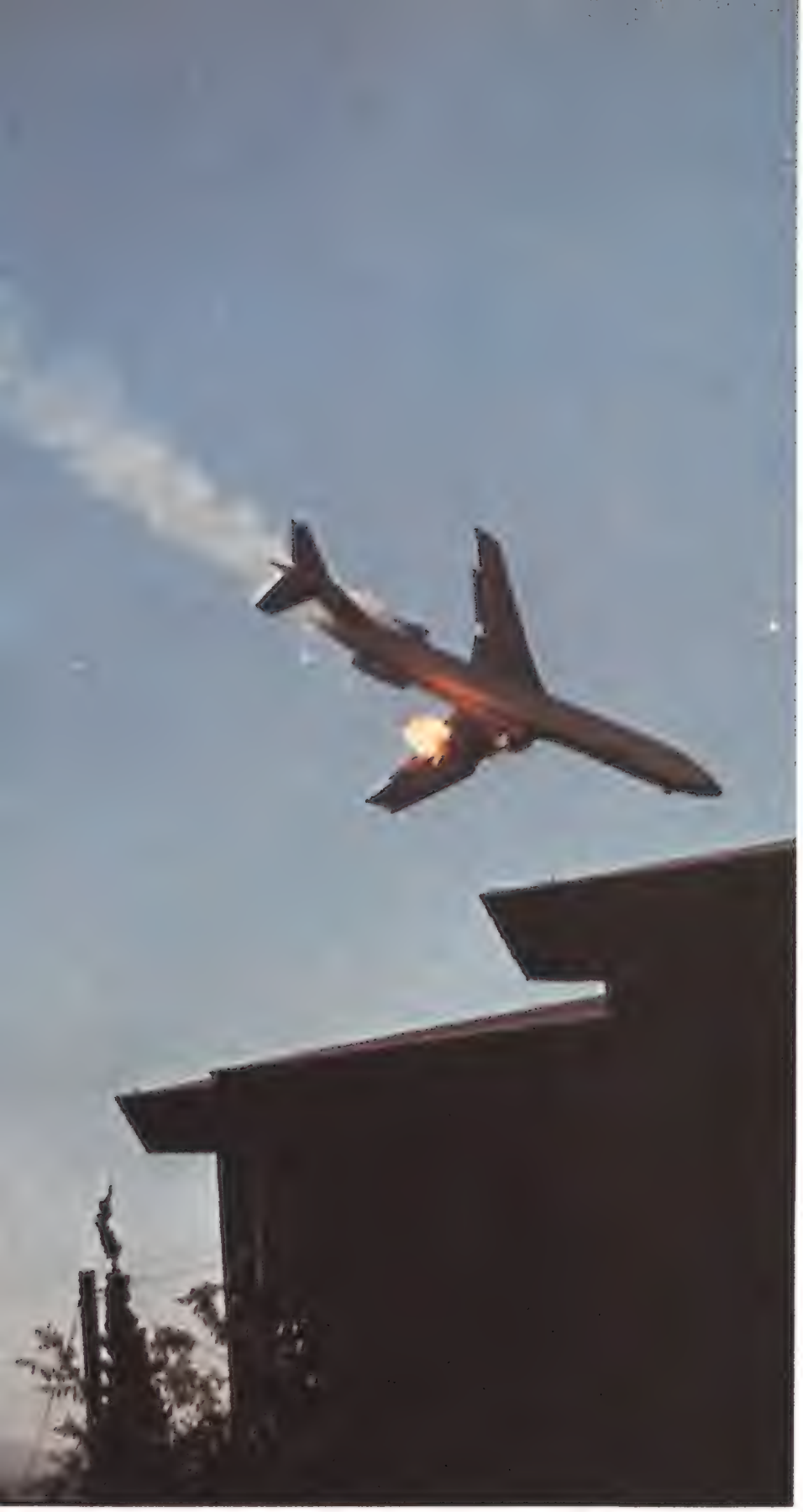
It is part of a larger question: how safe *is* the air? Horror stories from the news bedevil the mind, and distort the judgment, of anyone who asks. While accidents involving scheduled airliners are few, when they happen they can be stunning in their magnitude. And of the ways in which accidents can happen, the one that perhaps generates the most foreboding—and heated controversy—is the midair collision.

The author, long a private pilot, wrote about coins in SMITHSONIAN's *March 1980 issue.*

Moments after midair collision with a little Cessna, a 727 is ablaze over San Diego.

One sunny fall morning at San Diego, a pilot and his instructor practiced "blind" landings in a small Cessna. Meanwhile a Pacific Southwest 727 approached Lindbergh Field. The air was crystal clear, radar had both planes on its scopes in the control tower, both pilots were given "traffic advisories" warning that they were near to each other, and both acknowledged. Yet moments later the planes collided and 144 people died.

Not long ago there was a near-reprise of that scene: another PSA 727 and another Cessna narrowly avoided colliding at San Diego. They came so close, it



The stricken Pacific Southwest liner plunges toward earth. This 1978 disaster took 144 lives.

was reported, that one pilot could see the other pilot's sunglasses. Over the Carolinas, during a brief radar-computer "outage" or interruption, two Delta and Air Florida airliners barely missed a midair collision. In all of 1979 there were more than 400 near midair collisions, and in 120 cases the planes missed without even seeing each other. How could all of this happen?

There is no simple answer, not for the private flyer anyway. His problem and his attitude go back to Wilbur and Orville Wright. First men to achieve powered flight, they were also first to experience a fundamental fact: once launched, an airplane has to keep going and execute precise maneuvers to get safely back to earth. It cannot back up. Forward speed is the thread from which hang the lives of all aboard, and what the pilot decides to do has to be right.

Those who become pilots often develop into the same kind of rugged Red Baron loners that the Wrights were. They hate to be told what to do because they know that in the crunch they have to rely upon themselves. This can lead to serious disagreements between pilots and their regulatory body—the Federal Aviation Administration—which *has* to lay down certain rules in order to prevent chaos in the skies.

'See and be seen' v. *flying 'blind'*

Basically, safety in flight is the concern of the FAA. But so is the growth and development of aviation. The two are not always compatible. The FAA often stands accused of placing the economic well-being of the aviation industry above safety. Yet many feel that the FAA's safety measures are "legislating the small airplane out of the skies."

In any event, the FAA sets the rules, and they start out very simply. There are two basic ways of flying:

1) By visual flight rules, in which "see and be seen" is the primary watchword. Visual flight may take place only when there is a ceiling of at least 1,000 feet and visibility of three miles. The pilots need not file a flight plan, but must receive clearance from a control tower before taking off or landing. If the field is uncontrolled, he's on his own.

2) By instrument flight rules, which are used by pilots who have to get where they want to go, regardless of weather. Flight by instruments must be precise, and *must* be practiced constantly. This is what the pilot of that San Diego Cessna was doing.

To help him fly "blind" a pilot has a variety of sensitive electronic instruments. Radio aids keep him heading toward his goal and measure his progress over the ground. Once approaching his destination, he tunes in the instrument landing system and, keeping two needles centered, follows a radio-projected glide path to the point where he breaks out of the clouds and sees the runway ahead. He must be able to see at least a quarter-mile ahead in order to land; if he can't, he seeks an alternate field which he's noted on his flight plan.

Under instrument flight rules, the pilot is tracked by radar scanners from takeoff to landing. Air traffic control assigns the path he will follow and his altitude; it monitors his air speed, keeping him safely separated from other air traffic, and gives him his final headings as he approaches his destination. The pilot may not deviate from the assigned plan without clear-

The battle over air safety

Hundreds of small private planes fill parking space at Oshkosh after bringing visitors to the annual

ance. The people at the radar scanners can spot deviations almost instantly on their screens.

Does such supervision by a sort of federal "Big Brother" suggest an infringement of an American's right to freedom of the skies? Many of the nation's 750,000 or so nonairline pilots believe that it does, and that its wide powers are unnecessary. They believe that the ultimate responsibility for the safety of any flight should rest in the cockpit. They do not want to be told how, when and where to fly. A corporate pilot wants to be at the disposal of his company at any time. Also, compliance with all of the regulations for busy "terminal control areas" could cost a pilot more in electronic equipment than his airplane is worth. In response to these feelings, the Aircraft Owners and Pilots Association (AOPA), representing nearly 245,000 "general aviation" flyers, habitually takes a rigid stand against more flight regulations.

Air traffic control, however, is the very heart of the FAA's philosophy, and dates from the mid-1930s when "Airway Traffic Control Centers" in Newark, Cleveland, and Chicago opened. Maps to check aircraft positions and blackboards to chart their progress were the principal instruments then. Contact with nearby aircraft was maintained through voice radio. In 1938 the first regulatory code, the Civil Aeronautics Act,

Present (pink) and projected terminal control areas will dot eastern United States. In such air spaces, all planes are subject to rigid ground-control rules.

experimental air show. Of 14,000 U.S. airports only 428, including Oshkosh's, have control towers.

used this basic concept of regulation from the ground and it remains the primary procedure.

"Separation is the name of the game," said Ray Zazzetti, former Deputy Chief Controller at Boston's Logan Airport when I visited him. "Speed differential between airplanes of different types and sizes is nothing unusual; we've always had that. The thing to do is allow for it on approach and, depending on wind and weather, to put them down on different runways."

He led me over to a radarscope, a little larger than a 21-inch TV set, fastened to the wall at an angle so that it could be easily viewed from below. The "picture" it showed was a surprisingly clear, if somewhat cryptic, rendition of what was going on in the skies. Around and around the scope swept a bright finger of light, leaving behind the outlines of what looked like a map, sprinkled with small dots and blocks of letters and numbers.

"Each of those blips is an airplane," said Zazzetti, "and each one has what we call a data block attached to it. The data block identifies the airplane—UA 55, for example, would be United Air Lines Flight 55. A noncommercial plane is identified by registration number—your Tri-Pacer would have appeared as N9013D. Moreover, the data block gives us the airplane's altitude and speed over the ground in knots. That's vital to proper separation. If we have a propeller-driven twin Beech coming in at 100 knots, followed by a Boeing 727 at 160 knots, we can slow the Boeing down, and here on the screen we can see that he complies. If he doesn't or if we can't slow him enough, we can turn him out of the approach lane altogether and bring him back. He wouldn't like that much, but there are times when we have to do it. We *have* to keep the airplanes separated. That's our job.

"This information"—he tapped a data block with a pointer—"comes to us from a transponder in the airplane. No airplane is allowed to enter the designated airspace around Logan Airport without it. Any pilot coming here must also have two-way radio communication, radio navigation equipment and a private license or better. And he must be cleared into this air space by approach control."

Logan International is a terminal control area—like a huge chunk of air space covering an airport and the surrounding countryside as high as 12,500 feet. Within this air space the air traffic controller's word is law, for it is here, close to the terminal and in the landing process, that the danger of midair collision is greatest.

By the time they get to approach control, incoming planes are separated by about three miles and vertically by 1,000 feet. All of this, plus the almost total reliability of the modern jet engine, makes for an extremely high degree of safety for the commercial airline passenger, even if it has spelled finis to the old barnstorming concept of flying. As aircraft payloads grow in number—the prediction for domestic airline passengers carried in 1990 is 483.4 million compared to 290.3 million today—the safety system will have to grow with them. And here again the FAA proposals to cope with the situation run head-on into opposition from the Aircraft Owners and Pilots Association.

At present there are 85 times as many general aviation aircraft in operation as there are scheduled air-

Many "Sunday fliers" sit in cockpits like this;
15-year-old plane has two-way radios, no transponder.

liners. While the airliners carry by far the greatest number of passengers, private and business aviation claims some 100 million passengers carried per year, and most of these to airports never touched by large airliners. General aviation does far more than serve corporations, sportsmen, farmers and crop dusters; it handles about 12 million passengers a year on scheduled commuter planes.

"Actually, we're more interested in safety than anyone else," said Charles Spence, a leading spokesman for the AOPA. "The reason is simple: we're in the air more. But what the FAA is doing is misusing the word 'safety' to cover up a multitude of sins. The most horrendous collisions we have had recently have occurred under the very conditions which the FAA is now seeking to enlarge."

What Spence was referring to is the agency's latest plan to double the number of terminal control areas across the country.

Some controls being considered will make many old-time pilots hopping mad. One controller tells the story of an aging gentleman who used to barnstorm in his youth and graduated to bigger craft. "He had the most beautiful airplane you ever saw," the controller told me. "He must have had about $80,000 worth of the latest equipment. But when we asked him to turn on his transponder so we could get his altitude and airspeeds on our screens he'd say 'negative on the transponder; it's not working.' He reminded me of a guy who won't wear a helmet on a motorcycle just because it's going to be required by law."

What bugged this old-timer and many other pilots is a proliferation of controlled air space to the point where pretty soon there won't be anything else left. It is difficult not to agree that along the East Coast this may soon be the case (p. 46). Where once I flew in careless abandon in my little Tri-Pacer, there is now a bewildering array of controlled areas surrounding the major airports.

Even the AOPA's solution to the problem gives me small comfort when I consider taking up flying again. The AOPA would open up existing closed air space by establishing flight corridors leading downward to the runways and upward from them. "As matters stand now," Spence told me, "if the new FAA proposals go into effect there would be practically a solid wall of overlapping terminal control areas from Atlanta to Boston through which no aircraft could fly unless it met the equipment requirements and got the necessary FAA clearances."

What about Student Pilot Knauth? Would he be qualified to cope with these conditions? Twenty years ago, he was required to demonstrate proficiency in the use of two-way radio and one rather simple piece of navigation equipment. But today such qualifications would not allow any pilot into a congested terminal control area unless his plane were also equipped with a transponder.

Spence also pointed out that the present system cannot handle all the traffic, particularly at high-density airports like Chicago's O'Hare, Los Angeles International, Atlanta or JFK in New York. At many of these places you must have a reservation to get in. "A great many general aviation aircraft," said Spence, "are simply refused clearances because the reservations are all taken by airlines which have schedules to fulfill."

If the new proposals go into effect, the FAA will have to hire more controllers. Present controllers say that while the equipment gets more and more sophis-

This single-engine craft has up-to-date communication equipment, enabling it to fly into any airport.

Still more elaborate cockpit of airline jet has sophisticated backup systems for crew members.

ticated, human fatigue and the stress of handling more flights at a time during rush hours are a brake on the system. "The machines are outrunning the people," is the way one controller puts it.

The Air Line Pilots Association lists more than 40 matters on which it wants to see some action taken by the Federal Aviation Administration. Near the top is a long-standing gripe about a workable airborne collision avoidance system which, the pilots feel, not all the ground control in the world is going to provide. John O'Donnell, the association president, testified to the House Subcommittee on Government Activities and Transportation that the FAA "is still years away from certificating an operational collision avoidance system." He charged: "Hundreds of airline passengers have died in midair collisions in the past 20 years due to deficiencies in the present air traffic control system and its dependence on the 'see and be seen' principle."

John O'Brien, the association's operations and engineering head, pointed out to me a deficiency in the present ground-controlled system which may well have played a key role in the San Diego disaster. "Once a pilot has acknowledged a warning of traffic in the area from ground control," he said, "it is his problem to keep the other, possibly conflicting airplane in sight. But—has he seen the right aircraft? He has no way of knowing, and the ground controller has no way of knowing.

"Because of this, some pilots simply do not acknowledge traffic advisories. Admittedly, this is not a very good solution to the problem, but at least the ground controllers can see on their screens when two aircraft are on converging paths. The pilot, meanwhile, is even more alert than usual for an instruction to change course or altitude because of traffic; and believe me, if he gets that kind of instruction, he does not hesitate to comply.

"At San Diego, a traffic advisory was issued to the PSA jet, and it was acknowledged. However, it may be that the crew did not see the danger plane. The ground controllers, meanwhile, could see the converging flight paths, and even had a "conflict alert"—which means the computer projected a collision if existing headings and altitudes were maintained—but they did not pass it on to the jet because they figured the pilot there had the danger plane in sight." Well, the pilot may not have, and so 144 people died. Most accidents in the air are the result of a chain of failures, indecisions, wrong information, poor judgment and, once in a while, plain incompetence.

It is heartening to report, however, that at times all the petty jealousies, the politics, the self-interest and tunnel vision that characterize so much of aviation today is thrown out along with The Book, and a man on the ground simply gives everything he has to help a man lost in the sky. One such incident occurred at Bradley Field in Connecticut some months ago. It was a cloudy night with intermittent rain when Bradley approach control received a call from November-One-Oh-Eight-One Sierra advising that the pilot had lost his generator, was operating on battery power alone, and requested permission to land at Bradley. Beyond a radio and a most courageous pilot, the troubled airplane had close to no navigational aids at

all. For Eight-One Sierra was a restored Stinson Voyager on a cross-country trip.

The floor of cloud above which Eight-One Sierra flew at 5,500 feet was almost solid. The old plane was some 26 miles west of the airport. Controller Joe Murtari gave the pilot an initial course for an approach by airport surveillance radar. Murtari would talk the pilot down.

The pilot, fearful that prolonged conversation would drain his battery, requested permission to shut the radio off for three minutes. But five minutes went by before Eight-One Sierra was back on the air with grim news. The old Stinson was now 25 miles from Bradley and the pilot was having trouble staying on the assigned heading. "Every time I turn," he said, "the compass goes crazy." Furthermore, every time he started downward through the cloud floor, the plane went into an uncontrolled dive—again for lack of proper instruments for flying blind. In 23 minutes of trying, the pilot managed to get only five miles closer.

On the ground, however, Murtari was learning a few things. He could not ask this airplane to make normal turns, only little bits of turns which kept the compass in check. Very slowly, he worked Eight-One Sierra back to its proper heading and then, carefully, got it started on a slow descent to 2,500 feet. For five minutes, all went well. Then the Stinson began to drift off course again.

Slowly, gently, Murtari nursed the plane back. Ten miles out at 2,500 feet, Eight-One Sierra was at last in line with the runway, but still in the clouds. Murtari asked for a slow descent to 2,300 feet. The pilot started his glide—but then bang! He was in an uncontrolled dive. At 2,000 feet he managed to pull out and get straight and level again. The approach and runway lights were now at full intensity. The pilot had to see the flash of the strobe lights soon.

He was down to 900 feet when at last he spotted them. Minutes later, Eight-One Sierra was firmly on the ground and taxiing in. An airliner sat at the gate where it had arrived 15 minutes before the Stinson landed. Its captain, earphones on, was rooted to his seat. "I couldn't leave," he said. "I had to hear how this thing came out."

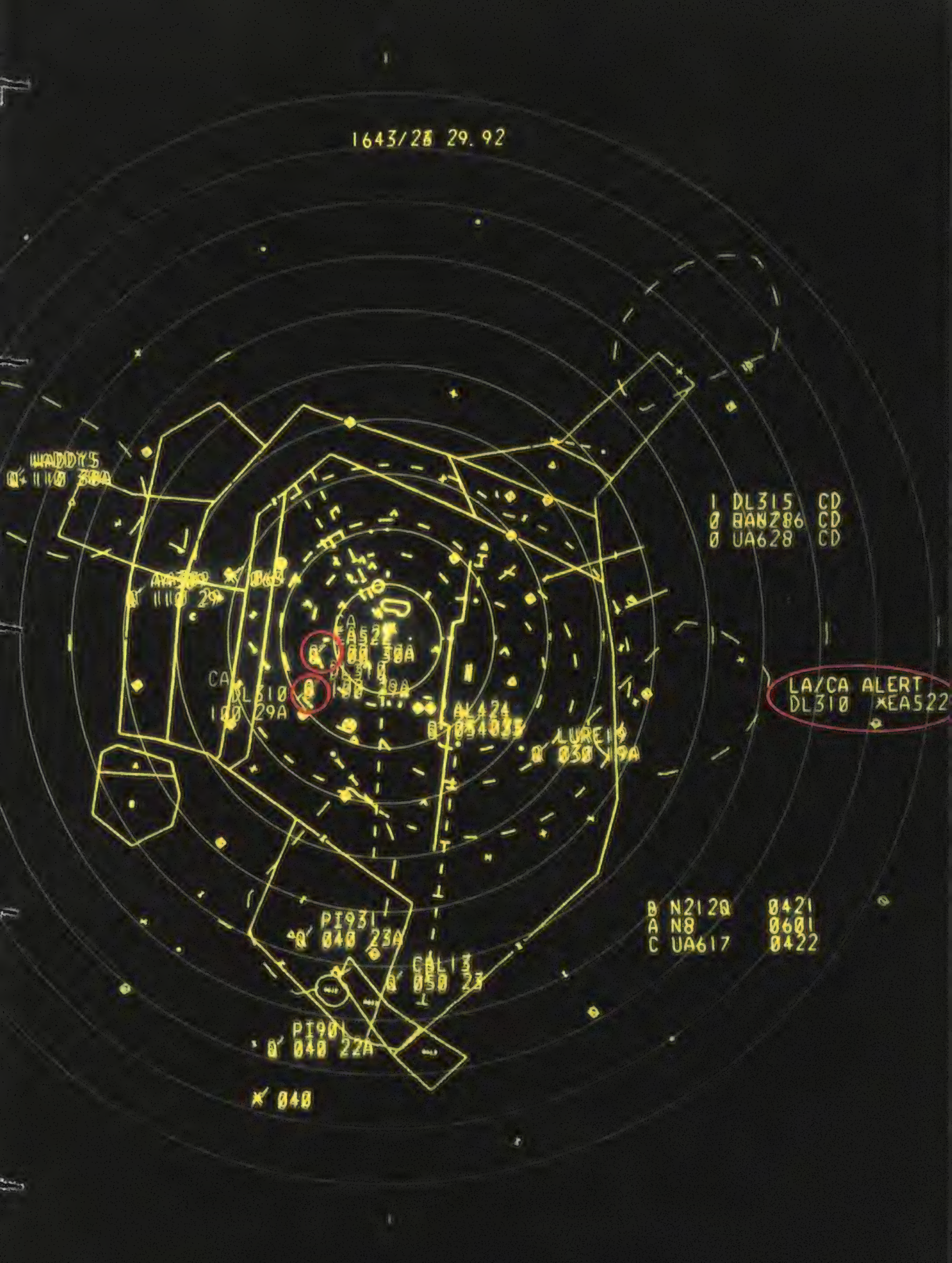
It hurts to say it, but that episode had no business happening at all. Beautiful old planes should no more be flying around in murky weather than Model T Fords should be out for a spin on the turnpike. Progress is bound to put an end to old-time flying.

Despite outcries from those dedicated to rugged, old-style individualism, ground control of flying gradually will be extended to every part of the country as increasing numbers of aircraft use available airspace. Large airports will have grids of microwave radio signals which will guide planes not only *to* the runway but right *onto* it. Small aircraft, without the costly electronic equipment needed to navigate through the microwave grid, will be excluded during instrument flying weather. Satellite airports on the perimeters of large cities will be upgraded and equipped to handle instrument landings, relieving the pressure at the hubs. Many such already exist: Teterboro in New Jersey, Van Nuys near Los Angeles and Du Page County near Chicago.

Eight-One Sierra or One-Three Delta probably could be accommodated, with some difficulty, at such airports. But we really should recognize that perhaps their day is done.

In Chicago's O'Hare radar room, two controllers monitor arrivals while two handle departures. Above them is a maze of electronic information.

"Conflict alert" at far right on radar screen at Washington National Airport is danger signal, prompted by too-close airplane blips at center.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It will happen the moment you present her with your gift of her "GOLDEN MOMENT" Pendant.

This exquisite piece of original jewelry is designed in the form of a miniature Hourglass made of Pure, Solid 18 Karat Gold. And, it uses genuine placer Gold dust to measure time — and each "Golden Moment" that you will share with her in the future. The outer framework of the Pendant is delicately fashioned to the contour of an Hourglass. The actual hourglass, which contains the Gold dust, is mounted on a pivoting Gold yoke and can be easily turned to reverse the flow of gold and start the passage of another new "golden moment."

The Gold dust used in this unique piece of Collector Jewelry is taken from the creek beds and streams located in one of America's oldest and most famous gold mining districts — "Gold Hill" — near Boulder, Colorado. It is slowly and painstakingly "panned" by hand in the very same way that Rocky Mountain prospectors have been collecting gold dust and nuggets ever since the Gold Rush Days in 1849 — for over 130 years.

The Hourglass shape has long been the symbol of eternity. So, a gift of this lovely Hourglass Pendant is a tender way to express your everlasting love. Whenever she wears this unique Pendant, she'll remember those shared "moments" and smile. And, after all — what pleases a woman more than the sentiment expressed with gifts of Gold and Diamonds. Whenever she wears it, it will start conversations — and give her a chance to tell others about the wonderful memories it represents.

RARITY ASSURED — NOT AVAILABLE IN STORES

To assure the rarity, the Limited Edition version of these extraordinary Pendants is being restricted to just 2,500 pieces, worldwide. They are being issued exclusively through our organization, the Limited Editions Collectors Society of America, and are being offered to collectors of fine, handmade jewelry, and to those individuals who are seeking truly unique "Collector Jewelry" pieces for gift-giving.

The design (which is protected by a copyright) was created at the J. T. Inman Goldsmith workshops. Perhaps you have already heard about, or seen, some of the other original creations which have been handmade at Inmans. They are a small "specialty" jewelry model shop, located in Attleboro, Massachusetts, that has been designing and making unique, fine, handcrafted "specialty" jewelry since 1882, serving clients such as Tiffanys, Cartier, Neiman Marcus, Shreves, Halls, and other fine jewelers for many years.

These extraordinary Pendants were created by Inman's designers exclusively for us, for sale to members of the Collectors Society and to other collectors interested in participating in this Limited Edition offer. They will <u>not</u> be sold through retail jewelry stores or department stores, and the *only* way to obtain them is by responding to the Society's advertisement.

A Registered Edition is also available in 14 Karat Solid Gold or Gold Vermeil (Solid Sterling Silver plated with Gold). However, when the Limited Edition is completed and sold out, all dies and molds will be destroyed, and both Editions will be closed forever.

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1,000 pieces of the Limited Edition have already been allocated to fill the orders which are expected as a result of a private offer being sent to the Society's own membership list. This group now numbers in excess of 8,000 serious collectors, nearly half of whom have been subscribers to our previous offers of unique "Collector Jewelry."

The remaining 1,500 pieces in the limited issue are being offered to the general public in advertisements such as this one, which are appearing in a number of national publications that will eventually reach over 10 million affluent readers.

We offer you an opportunity to be among the very first collectors who will obtain this new Limited Edition piece. Its a wonderful gift for a husband to give his wife on Mothers' Day — or to give mother — to tell her that you truly appreciate all the golden moments she gave you as a child. It also provides a great way for a father to tell his daughter — on Graduation Day — that he remembers all the golden moments that his "little girl" gave to him. It not only makes a unique, charming, and thoughtful gift, but it is one of the finest and most *meaningful* that you can ever give when you want to tell someone how much you care about the moments you have shared with her.

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The Pendant is sturdy and solidly constructed, yet it is very comfortable for her to wear. Its sparkling 10 Point, round-cut Diamond is mounted into a deep, firm "setting" to make sure it is secure.

Glass contains genuine placer Gold dust
Shown here enlarged: Actual size 1½ inches
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10 Point Genuine Diamond

The Hourglass — symbol of Time and Eternity — Fashioned of Pure 18 Karat Gold, Uses Gold dust to Measure the Golden Moments you spend with her.
And, the Gemstone — a Genuine 10 Point Diamond — is Forever.

The placer Gold dust is permanently sealed into the pyrex Hourglass and cannot be lost. It will maintain its golden glow for endless moments — forever.

You will be able to tell her that her Pendant has been individually hand-crafted, cast by skilled goldsmiths, and then hand-assembled and polished with the utmost meticulous care. Seventeen separate hand operations are required to assemble each and every Pendant prior to the final inspection by the Master Goldsmith. Every Pendant comes with a 12 Karat Gold-filled Chain, 24" long, which she can easily adjust for casual or dress wear.

Every "Golden Moment" Pendant is an extremely outstanding jewelry value. Many ordinary Pendants — with little to no sentimental meaning — having the same weight content of Gold, cost considerably more. You can verify this by going to any jewelry store to examine the prices of the wide variety of the factory mass-produced pendants that are available. You will find that many of them cost more, and that most cost <u>much more</u>, than the "Golden Moment" Pendant. However, none will have our Pendant's unusual combination of hand-craftsmanship, rare beauty, unique design — or its most important feature — its impressive "sentimental" significance.

There is a simple explanation for this outstanding Pendant value. The Limited Editions Collectors Society makes all of its exclusive offerings *directly to the public*. Its products are not distributed through retail stores, catalog houses, mail-order marketing syndicates, who must add "markup" to the items they purchase for resale.

Because of the very small quantity of Pendants being offered, if you wish to share a new "golden moment" with the special person in your life and commemorate those important golden moments in your past, we strongly recommend that you act promptly by mailing us your order using the coupon below, without delay. Or, better still, to be *sure* that your Pendant is reserved for you, *call us at our toll free number* - 800-225-5252 — to place your reservation before mailing your order.

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Every Pendant in both the Limited and the Registered Edition is unconditionally guaranteed. We invite you to examine this unusual and distinctive Collector Jewelry piece, without any obligation whatsoever. Look it over. If you are not completely satisfied, when it arrives, send it back for a full refund. (We'll also reimburse you for whatever it costs for postage and insurance to return it.) Or, even after you have presented this stunning Pendant to that special person, if you find that she is not totally pleased, we will buy it back. In fact, due to the very limited availability of these Pendants, we will be glad to re-purchase yours any time within *one full year* from the date of your order. After all, in the long run, we don't expect Diamonds or Gold, or Gold dust or Silver to lose their value — they never have.

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The Collectors Society is a private organization, founded by a group of avid collectors, art lovers, and historians, including some who have distinguished themselves in the fields of Arts and Letters. In addition to creating and marketing unique and exclusive fine Collector Jewelry, the Society also issues authentic reproductions and replicas of historic artifacts, plus exclusive artworks and official Commemorative products. It has received a number of important awards for excellence and has been commissioned by a number of non-profit organizations, including the Winston Churchill Foundation, the Freedoms Foundation at Valley Forge, the Old North Church Museum, and the John F. Kennedy Library Fund, to create and market their official commemoratives to collectors.

Every collector item issued by the Society is protected with a Certificate of Authenticity signed by the Chairman of the Board of Trustees of the Collectors Society. Your Certificate, showing the serial number of the particular Pendant sent to you (the number recorded in the Society's Master Registry of Ownership and microfilm library), will be sent to you within thirty days after you have received delivery. This protects your investment against inferior imitations or counterfeits and also documents the value of your serially-numbered Pendant for insurance purposes.

The "GOLDEN MOMENT" Pendant is truly a captivating piece of Collector Jewelry and a gift which she is sure to treasure always — one which will assure many more golden moments each time she wears it.

We again stress the fact that only 1,500 are being publicly offered. So, to avoid possible disappointment or needless delay, we strongly suggest that you mail your completed order coupon just as quickly as possible before the small Limited Edition is completely sold. There is also another reason for acting promptly. Due to the volatility of the gold market, we cannot guarantee the prices published here for any longer than thirty days.

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By Wesley Marx

Plug-ugly minnows or 'living jewels,' carp stir emotions

First imported for food, these hardy fish soon acquired a reputation as gangsters—but now their popularity is booming again

In the magical shadow of Disneyland in California, fountains gush, a miniwaterfall thunders. Within throbbing earshot of a Tahitian war dance, I look down upon an illuminated pond. There, unperturbed by the drums, fireworks and the gawking tourists, are the carp. They stream by like a rainbow on the move.

The ornamental carp, or koi, live in a nation where attitudes toward them range from awe to outrage and where emotions promise to become even more intense.

Scott Soule, the keeper of the carp at Disneyland Hotel, personifies the contrary attitudes carp can inspire. One morning Soule banged on the metal railing along the footbridge over the koi pond. Fish from throughout the pond converged into a splashing, milling, squirming swarm of colors at Soule's shoe tips. "We have 370 carp," Soule observed. "They represent more than $20,000 worth of fish." Some carp extended their heads above water and opened their toothless mouths wide, like an operatic chorus hitting a high note. Soule dipped his hand into a blue plastic bucket and cast small pellets on the pond waters. The splashing increased; the vivid colors of the koi—red, black, white, metallic yellow—became a blur.

The colorful fish were being fed by a man who once supervised the killing of carp by the thousands. Soule

Brilliantly colored koi, or ornamental carp, lash their pond water into foam in a feeding frenzy.

The roller-coaster image of the carp

A hundred or more koi fill this pond behind the Playboy Mansion in Holmby Hills, West Los Angeles.

Scott Soule throws food pellets to the koi in a pond at the Disneyland Hotel. The 370 fish are worth

spent more than two decades with the California Department of Fish and Game, where one of his official tasks was to rid the public waters of carp. As he cast more pellets to the koi, Soule recalled some of the tactics used. "We would spread toxic chemicals, but some carp would always find refuge in a submerged spring or a bank cave." Sometimes, Soule and other fishery workers would drag large nets through shallow lakes to trap carp and kill them.

Why did fishery managers like Soule participate in nationwide carp purges? In the 1870s, European immigrants to North America were homesick for a prize food fish reared in ponds in the Old World. To their despair, the common carp (*Cyprinus carpio*) was not native to the New. This longing for carp impressed a new federal agency, the U.S. Fish Commission. Why not import a fish that farmers could raise in ponds to augment U.S. fish production?

At the time, this question seemed rhetorical. The carp's reputation was as secure as that of the salmon or the trout. Nations as polar as China and Germany shared a common appreciation for this husky, large-scaled member of the minnow family. Fish culture owed its existence to carp. While carp species differ

more than $20,000. Champion fish can have a value of $50,000. Koi are categorized by color combination.

The Disneyland koi are not at all shy at feeding time; they will even eat directly from a human hand.

in spawning, feeding and habitat preferences, they are all relatively hardy. They can flourish in turbid, sluggish waters with low oxygen levels that would repel many other fish.

By 1000 B.C., Chinese farmers could transport this sturdy fish from natural habitats and rear it in ponds and rice paddies. Carp grow to edible size rapidly. Unlike trout or salmon, they do not require expensive animal-protein feeds, although Chinese farmers would enrich the natural food base of their ponds by adding vegetable discards and swine manure.

Could the carp be any more accommodating? Yes. Chinese farmers could double or triple pond production by stocking different types of carp. The grass carp would graze on aquatic plants. The silver and the bighead would subsist on plankton. Mud carp and common carp would subsist on bottom organisms.

By the 12th century, European monks were rearing the common carp in ponds. By the 19th century, carp culture occurred throughout Europe, but was particularly popular in Germany, Poland and Austria-Hungary. To immigrant Americans from these regions, carp was a treat, a sort of aquatic turkey, associated with birthdays, weddings, holidays.

Another trait contributed to carp's cultural luster. Despite their apparent affinity for still or slow-moving waters, carp are strong swimmers powerful enough to leap two and three feet high into the air. They are capable of negotiating river rapids and clearing small waterfalls. They can even jump clear of ornamental carp ponds, much to the distress of their owners. In Japan, parents fly the carp flag, *koinobori* (p. 58), in the traditional hope that their offspring will be as strong as the carp.

The U.S. Fish Commission was not about to say no to a potential fish bonanza. By 1877, passenger vessels carrying European immigrants to Ellis Island were also carrying carp from Europe's finest ponds. The carp's hardy nature was equal to the transatlantic crossing. To restore oxygen in the tanks, the carp keeper would agitate the water with his hands. To thwart rising temperatures, the keeper might add a block of ice.

The European imports were placed in carp ponds

The author, who discussed limits of marine resources in the June 1974 SMITHSONIAN, *is now working on a book about the oceans to be published next year.*

In Japan a *koinobori* (carp flag) flies on Boys Day, May 5. The carp is a symbol of strength and courage.

in Washington and Baltimore. An initial shipment of 345 German carp populated the ponds with thousands of young fish. The carp were distributed by railroad, wagon and mule to eager Georgia farmers, Texas ranchers, California gold miners and German immigrants in Wisconsin. Prospective carp raisers did not have to file environmental impact reports. They only needed a letter of endorsement from their local congressman.

Some congressmen must have suffered writer's cramp. In 1881, the U.S. Fish Commission distributed 143,696 fish to 5,758 applicants. "Do not neglect us," implored I. D. Pasco of Nye County, Nevada, in a letter to the commission. "We are all Uncle Sam's boys, and will appreciate the fish beyond any other section . . . ." Nevada was not neglected. By 1880, the Commission was accepting applications from Canada.

Unfortunately, the carp farmers became victims of their own success and the carp's fecundity. According to one observer, carp became "a worthless drug on the market." The price dropped to 1½ cents per pound. A penny and a half went a lot further in the 1880s than today, but not that far. Moreover, the disillusioned farmers found themselves competing with fishermen who were catching pond carp that had escaped into public waters.

By 1897, the federal government ceased distribution of carp. Ponds were being abandoned or drained. Many forsaken carp escaped into other waters. The federal program to stock farm ponds was now serving instead to stock the nation's lakes, streams and rivers. In 1894, Dr. David Starr Jordan, a fishery scientist and president of Stanford University, had reported that the carp was "very common" in California's largest natural lake, Clear Lake. Said Jordan: "In California, this species is a nuisance, without redeeming qualities."

Many sport fishermen and waterfowl hunters concurred. They felt that the carp's spread and the decline of some popular game species was no coincidence. Carp were accused of eating native wildlife out of house and home. The evidence was all too visible: carp uprooting aquatic plants and muddying clear waters. An editorial in the San Francisco *Evening Bulletin* expressed a popular view: "If every one of these fish could be removed from the water to the land and there employed as fertilizers, a substantial gain would be made."

The now "disgusting fish" was ranked with the thistle, the English sparrow and other infamous imports. Concern over the carp's environmental trespasses escalated to concern over its personal habits. In 1897, a Canadian fishery official claimed the carp "suffers from fish leprosy" and was fond of "coarse and loathsome food." Needless to say, no *koinobori* were swimming in the New World sky.

Fishery officials, once besieged with requests to distribute carp, were now implored to purge carp from North America. Public supervisors of "rough fish control" began spending millions to sieve rivers, drain lakes, draw down reservoirs, fence wetlands and poison ponds.

A new home—and a bum rap

Fishery officials saw to it that few regulations would encumber the success of prospective carp hunters. In most states, the nets, spears, bows and arrows that would land a fisherman in jail if used on many game species could be used on carp. Similarly, there were few bag or size limits to curtail fishing success. Despite everything, however, the carp continued to flourish and has ever since. Today the carp is often a scapegoat for Man-induced changes that adversely affect native fish and waterfowl. Dammed rivers, changed water levels, lower oxygen levels, increased silt runoff, pollution, depletion of game fish—all tend to favor the carp's survival over more sensitive species. The common carp's habit of uprooting aquatic plants in its search for insects and other small organisms is still considered detrimental to plant-eating waterfowl and

to fish who require clear waters. But most state fishery agencies now feel it is more effective, if not more economical, to protect and restore our rivers rather than to purge carp.

With the carp here to stay, another shift in public attitude has become evident, inspired less by public edict than by grass-roots appreciation. Today, carp fans include the U.S. Army Corps of Engineers, irrigation district officials, and even members of the carp's traditional detractor, the sport-fishing fraternity.

Sport fishermen do not have to get into the wilderness to catch carp; the hardy fish can flourish in urban America. The Arizona Game and Fish Department has even stocked urban recreational lakes with common carp to accommodate young anglers. With a new generation of fishermen being weaned on carp, outdoors magazines may have to start running photo spreads on trophy carp.

Defying traditional taboos, Rockford, Illinois, has for the past 12 years hosted an annual Rock River International Carp Catching Championship. The event, sponsored by the Winnebago County Council of Sportsmen's Clubs, has attracted up to 500 competitors. Not everybody competes with fishing poles. "Hoggers" prefer to catch carp by hand. They crawl along river shallows feeling for carp amid sunken logs and junked refrigerators. Once in "touch," the hogger attempts to insert his thumb and fingers in the carp's mouth or gills to secure a winning grip. It makes for a wet, chilly and muddy hunt, but hogging may rank as the fairest encounter in sport fishing.

Carp have one influential ally dedicated to improving their image. Vern Hacker is fish-control supervisor for the Wisconsin Department of Natural Resources. He has written a tribute to rough fish, *A Fine Kettle of Fish*. Hacker concedes that carp and other rough fish "may have the reputation of a motorcycle gang, but don't let their reputation frighten you away." Carp "are excellent fighters, slugging it out on the bottom and bending the rod to the limit." After appealing to our spirit of angling adventure, Hacker tantalizes us with recipes on how to bake, stuff, marinate and poach carp.

(Some first-time eaters of carp are turned off by too many small bones or a muddy taste. Hacker blames the cook for this. Carp should be scored or cut every ¼ to ⅜ inch, so cooking oils can soften up small, scattered "Y" bones, he says, and removal of a prominent "mud vein" removes the muddy taste.)

Many Americans of Chinese descent don't need to be educated about carp. Today, many Chinese fish markets have tanks that swarm with catfish and carp. A customer points to the fish he wants. The market manager dips a net into the tank and drops the selected fish on the wet, slippery concrete floor. If the customer nods his head in approval, the manager

The carp is a frequent subject in Japanese art. This picture, *Swimming carp with blue flowers,* is by the Individualist school painter, Kuroda Toko, who died in 1846. Not all species have the barbels.

Freer Gallery of Art

A grass carp is netted from an isolated research pond at the University of Florida in Gainesville.

clubs the thrashing fish over the head to close the sale.

America's growing interest in ornamental carp serves to spur other businesses. Ten years ago, Jerry Scoggins was a machinist in Orange County, California, who as a hobby built a koi pond in his front yard. (Koi, like all carp, are related to goldfish.) Then he and his wife Dee began to sell them. Today, they are in the business full time. Scoggins originally had to go to Japan to import his stock. In a mountain valley there, the Niigata area, rice farmers double as koi breeders. They have traditionally monopolized the breeding of "living jewels," being rather secretive about how they select the best parental combinations. Scoggins noticed that the bill to airfreight the carp to California often exceeded the cost of the carp.

Scoggins decided to breed koi himself. He was told that good koi could not be bred in the United States. "When I said I was going to do this in the California desert, I really got weird looks," recalls Scoggins. A desert climate, however, can permit an extended growing season. Moreover, to buy inexpensive land in California, you have to go to the desert.

Scoggins picked a sagebrush site in the Mojave Desert safe from both blowing sand and flash floods. "That's my male lake," says Scoggins as he points to one of his 30 ponds. The sexes are separated to avoid accidental spawnings. Scoggins will place one female with three to seven males in breeding tanks. Once spawning occurs, the adults are removed so they do not eat the eggs. The eggs stick to ropes, plants and pipes. They hatch in about six days. Scoggins will sort the young fish in about 45 days. Some carp will be deformed. Others will be "dirty," or have poor patterns or colors. Some will have good color patterns but on the belly instead of on the back, where they can be properly viewed. "If you breed 200,000 carp, you will be lucky if you keep 3,000," says Scoggins.

A loud Hawaiian sport shirt would be reduced to a whisper beside some of Scoggins' brighter products. High-quality koi will fetch $500 and up wholesale. (This works out to about $100 a pound, a sum that would stun those beleaguered carp farmers who had to settle for a penny and a half a pound a century ago.) A champion quality koi may command $50,000.

Twenty-five years ago, Mitsuru Nakamaru was in the pinball and vending machine business in Hawaii. Today, he is one of Southern California's most prominent koi dealers and somewhat of a legend. In 1968, Nakamaru took his prize *kohaku* (a red-and-white koi) to a Japan koi competition, presided over by 35 judges. Nakamaru returned to the United States with both the "Best in Show" and "Grand Champion" trophies. Nakamaru feels that better communication among U.S. koi owners can and will overcome Japan's traditional lead in developing koi. To accomplish this, Nakamaru helped organize koi clubs.

Ironically, with carp becoming more readily accepted in the New World, another controversy has emerged. The grass carp is the powerful swimmer whose leaps above water inspired Chinese poets and Japanese artists. Its body is more elongated than the humpbacked common carp. While the common carp is bronze tinted, the grass is dark green with silvery sides and undersurface. A common carp may reach 50 pounds; grass carp can reach 70.

The grass carp does not spawn in ponds, only in large rivers. When thunder sounded, Chinese "frymasters" would rush upriver with fine mesh nets. Thunder signaled the advent of the rainy season, in which migration and spawning were triggered by high water and turbulence. The larval grass carp, or fry, netted by the frymasters would be used to stock ponds. The job of the frymasters disappeared after the 1950s when China learned to induce the grass carp to spawn

with hormone injections. They can now be airlifted around the world and made to spawn in tanks thousands of miles away from Chinese thunder.

U.S. interest in the grass carp centers on its food preferences rather than its edibleness. The grass happens to browse on the same plants that clog our waterways. The Army Corps of Engineers, which must keep our waterways navigable, has spent large sums on herbicides and on mechanical harvesters to remove the plants, which can foul propellers as well as fishing lines. The plants, like the common carp, tend to survive such control efforts. That the grass carp will devour these plants for free and without toxic aftereffects excites those officials who do battle with aquatic plants. To botanist Richard Yeo, an aquatic weed expert with the U.S. Department of Agriculture in Davis, California, the grass carp is an "aquatic cow that will eat and eat." It can eat up to its own weight

A tiny radio transmitter is inserted into the fish so that its subsequent movements can be followed.

in a day's time. The grass carp can withstand cold winter waters that can kill another imported plant eater, the tilapia. It can fit into canals that defy entry of another biological control agent, the tropical manatee (SMITHSONIAN, December 1974). Unlike the common, the grass carp does not roil the waters.

This fish arouses the interest of people with aquatic plant problems across the nation, from operators of waste-water treatment lagoons to irrigation pond owners. An extensive network of irrigation canals serves the desert valleys of Imperial and Coachella in California. One species of submerged plant, hydrilla, can cut canal flow rates in half, and is already restricting the flow of irrigation water in the Imperial Valley. (The plant's prodigious growth rate qualifies it as a research candidate in biomass fuel projects.) "Nothing eradicates it," observes one frustrated official. "It can reproduce four different ways."

The grass carp is now being viewed as a possible savior. But the California Department of Fish and Game does not like the grass carp. California prohibits the import of the piranha, giant toad, mongoose, cobra, the African clawed frog, the freshwater stingray and the flying fox (a large bat that likes fruit). The grass carp cannot bite, sting, poison or consume crops. Why is it feared?

The department's position paper on grass carp asserts that it "might become an even greater 'pest' than the common carp." The grass carp eats the same plants that serve as shelter for juvenile fish and provide food for waterfowl. In its juvenile stage, the grass carp subsists on plankton and could become a food competitor to existing juvenile species.

The grass carp cannot be considered a strict herbivore. Scientists at Louisiana State University have observed the grass carp preying on the young of that state's esteemed crawfish. California's concerns are shared by the 33 other states that ban grass carp.

Such caution is a legacy from the common carp's New World debut. Today's global exchange of biota, expedited by airfreight, underlines the need for such caution. Hydrilla is not native to the United States. A tropical plant, it was introduced for use in aquarium tanks.

Florida, which spends up to $6 million a year to combat hydrilla, has permitted grass carp to be stocked in water bodies considered escape-proof. In one research project, the Army Corps of Engineers installed backup escape barriers to stop grass carp from wandering beyond one lake's outlet. Scuba divers inspected

Now "wired," the carp swims off toward a patch of hydrilla, the plant biologists hope it will control.

the barriers periodically. Precautions even included plans for corrective actions if a grass carp is found downstream. The "most drastic corrective action . . . is hereby defined as killing every fish of every species of every size in the lakes to positively eliminate every single white amur." White amur? This is an alias used by agencies that prefer not to have the grass carp associated with the reputation of the common carp.

A breeding discovery in Europe may still pave the way for expanded use of the grass carp in the United States. In the Soviet Union and Hungary, female grass carp were crossbred with male bighead carp. The offspring are likely to be sterile. A commercial fish breeder in the United States, J. M. Malone of Lonoke, Arkansas, has been able to produce this hybrid. A sterile hybrid would remove the risk of reproduction if it escaped into natural waters. California, among other states, is willing to consider use of sterile hybrids, pending results from further research.

Next year some 800 hybrids will be stocked in screened-off test canals in the hydrilla-cursed Imperial Valley. Says Tom Jackson of the U.S. Fish and Wildlife Service: "We will be observing their environmental impact, how effectively they graze hydrilla and the type of security and handling they require." The project seeks to establish a balance between water-delivery needs and enough plant growth to sustain canal fish populations that already attract anglers. The hybrids could even become part of the fishery.

If the hybrids prove their mettle in the desert canals, Jackson foresees some interesting ramifications for the western states. Fish production might be greatly expanded in the West's huge system of irrigation canals while water delivery could be improved through control of plant growth.

The opportunity to reconsider inland fish resources and the carp's role in human affairs comes at a timely moment. In the 19th century, people could afford to bypass carp because other meat and fish protein was so cheap and abundant. Protein may still be abundant at the supermarket, but the prices are no longer cheap. The annual world fish catch has leveled off in the 1970s and fish, once the cheap protein alternative, can be as expensive as meat. The United States, like other industrial nations, has relied on capture of "wild" marine stocks for most of its fish production. Aquaculture only contributes three to four percent to the nation's total fish production.

China has relied on inland fish production and on the versatile, hardy and accommodating carp. Today, China's annual fish production exceeds the U.S. fish production and rivals that of the Soviet Union and Japan. And the Chinese farmer does not need a capital-intensive, energy-intensive fishing fleet to harvest his pond. Estimates of China's annual production have ranged from 6.9 to as high as 17.5 million metric tons. The total U.S. fish catch in 1978: 2.7 million metric tons.

Broad dietary preferences promise to be as critical as fast vessels and large nets in the success of future national fishing strategies. Perhaps we should give baked carp paprikash a try.

Ray Burgess hefts a carp in a Los Angeles market. In some specialty stores the fish are sold alive.

Carol Nakamaru displays a fish at the Asahi Fancy Koi pond in California. Koi may live for 200 years.

"Environmental activists? At Bethlehem Steel, about 1,000 of them help clean up the air and water."

Dr. David M. Anderson, Corporate Director, Environmental Affairs

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D.M. ANDERSON

Glass sculpture by Czechoslovakian artists Stanislav Libenský and Jaroslava Brychtová graces lobby.

The new museum, a flowing extension of the existing Glass Center building, is sheathed with a surface which changes from matte to luster, depending on the play of light and shadow through day and dusk.

By Michael Olmert

A new glass house to house the best of beautiful glass

In a gleaming showplace, the Corning Museum displays 3,500 years of Man's infatuation with a very fragile, useful and elegant material

The new Corning Museum of Glass building (above)—scheduled to open June 1 in upstate New York—is a grand structure, a cut-glass gemstone that seems to have been plucked from the virtually timeless history of glassmaking and gingerly set down among the workaday chimneys and mills of a typical American factory town, circa 1900.

At first glance the building seems formless. Indeed, its outer surfaces appear to slowly undulate and glow with the setting sun and the waxing of the moon. There is purpose to this flow, this elegant viscosity—because the new building really resembles nothing so much as molten glass fresh from the firing tank and ready to accept any form that is imposed on it by its master craftsman.

The museum stands as a symbol that glass has come a long way in its nearly 3,500 years. There is no other material that Man has fashioned for so wide a range of uses, from the reverential and ceremonial to the prosaic and utilitarian, from beads and amulets to spaceships and telecommunications fibers. The result has been a long and lustrous record of use, and, to cele-

brate that tradition, architect Gunnar Birkerts has ribboned the building's main floor with a double frieze of mirrors, a sort of periscopic overhang. The resulting indirect view emphasizes how much the industry that takes up so much of the surrounding town depends on the historic and esthetic artifacts that are cradled within the museum. At the same time, the view can be considered to be two-way: that today's art and craft of glassmaking are a straightforward extension of the glassmaking of the past.

Corning Glass has occupied this valley floor location along the Chemung River for some 110 years. Here, in 1879, the first light-bulb blanks were blown for Thomas Edison's incandescent light bulb, invented that year. In 1903, Frederick Carder, an Englishman, founded Steuben Glass Works (a subsidiary of Corning Glass Works since 1918) and specialized in colored and fancy glassware.

These days, almost 800,000 visitors a year troop through the Corning Glass Center, which houses the entire production line of Steuben Glass as well as exhibits on the modern glass industry. At one time, the center also housed the Corning Museum of Glass, but the Hurricane Agnes flood in 1972 inundated the city and much of the museum's treasure as well. The two prime movers of the original museum, the Honorable Amory Houghton and Arthur A. Houghton jr.—coincident with an international revival of interest in glass—set about to build a new home for the burgeoning collections, this time above the 1972 flood level.

Actually, the original museum opened in 1951. Arthur Houghton supplied the initial momentum to the collection. In 1941, as president of Steuben Glass, he began to collect and exhibit rare examples of English and Irish glass, and he opened a special antiques room in the Steuben shop in New York City. When the Corning Museum opened its doors, it was home to 2,200 pieces.

Today, the new museum houses some 20,000 pieces of rare glass as well as the world's largest collection of books relating to glass. The museum staff is active in making new acquisitions (recent example: an amazing glass table made in Russia in 1804 for Maria Fedorovna, the mother of Czar Alexander I), in publishing the

Photographs by Henri Dauman

A new museum for glass

Corning Museum of Glass

This tiny glass head, probably of Egyptian pharaoh Amenhotep II, is from the second millennium B.C.

A highlight of the collection is the Roman Daphne Ewer, dating from late third to early fourth century A.D.

Journal of Glass Studies, conducting special archaeological research, and preparing traveling exhibits. A show of the best of contemporary glass, culled from 6,000 entries submitted by today's new breed of studio and industrial glassmakers, is now traveling: it is presently at the Smithsonian's Renwick Gallery in Washington, D.C. (until September 7). It will then go to New York City (Metropolitan Museum of Art, November 19-January 13, 1981); to San Francisco (California Palace of the Legion of Honor, March 28-June 14, 1981); then abroad.

The museum is opening amidst a blaze of rekindled interest in glass. Last June, a 1,900-year-old Roman glass bowl went for more than half a million pounds at Sotheby's in London. And last fall, the ultimate compliment of all: burglars hit an exhibition hall in Holland and came away with a handful of carefully selected works in contemporary glass. In their thoroughgoing pursuit of the beautiful and costly, these second-story men coolly passed over the cash in the till.

In fact, among today's artists, sculptors and craftsmen, interest in glass is especially insistent. Virtually all of this can be traced to the influence of two Americans: Dominick Labino, now a retired executive from Johns-Manville, and Harvey Littleton, a studio glassmaker who had taught at the University of Wisconsin at Madison. Together, they made possible what is now called the American Studio Glass Movement. Their technical innovations, including a small, manageable furnace and a formula for an easy-to-melt glass, enabled glassmaking to move into the artist's studio. Because of their work, artists around the globe are now

Outstanding examples of very old glass: at left, Islamic bowl, early ninth century; below, from Persia, fifth century B.C., cast and cut dish; and above, enameled Roman bottle, third century A.D.

stretching the limits of glass as a medium of expression.

The surprise is that it has taken so long. For 3,500 years, glassmakers have striven to make practical, although beautiful, objects: vessels, amulets, windows, lampshades, paperweights, cufflinks. Today's artists hardly bow in the direction of utilitarianism before moving on to fashion objects that can delight the eye and even comment on the universe and Man's place in it. As a medium for such expression, glass is wonderful. It is neither all surface (as painting is) nor all structure (as much modern sculpture is). And because its surface *is* its structure, the debate between appearance and reality that vitiates so much of art theory simply disappears: there are no hidden bones beneath a skin of glass. Glass finishes are virtually always bright and nearly always translucent, if not transparent, yielding a dynamic luster that ebbs and flows with changes in available light.

In this way, each completed glass piece reflects its origins. Glass typically begins life as a simple mixture of soda, silica and lime, which is heated in a furnace to transform it into a glowing, orange mass. (The temperature when this happens is a cool 1,200 degrees C.) The artist or craftsman then extracts a "gather" of the molten glass on the end of a blowpipe—a hollow metal rod—upon which he fashions the object (p. 76). Glass can even be pulled into lengthy threads because the melt has the consistency of hot taffy. After the piece is shaped, it goes into an annealing oven where it is cooled slowly—a vital step that releases any strain created during the forming process.

"Many people are surprised that the structure of glass at a molecular level more closely resembles that of liquids than that of solids," says Robert H. Brill, the Corning Museum's research scientist. "Glass does not fit into the definitions of any of the three 'classi-

Michael Olmert is an author and graphics designer who has written frequently for SMITHSONIAN, *most recently on Dibner Library in the October 1979 issue.*

Museum masterpieces include, from left, goblet from Amelung glasshouse; French salamander paperweight; Chinese 18th-century vase; Peachblow vase; Tiffany vase; sugar bowl (in Wistar style); Labino sculpture.

cal' states of matter—gaseous, liquid and solid. X-ray studies show that, although glasses have the mechanical rigidity of crystalline solids, they have the random or disordered structure of liquids. Actually, then, glass is a fourth state of matter. Some people call this the 'vitreous' state and that'll do nicely."

Another confusing fact is that there are numerous combinations of chemicals that can slip into the glassy state when they're heated high enough (from 1,200 to 1,500 degrees C). In glass factories around the world today, thousands of different recipes are melted.

One of the oldest of those combinations is found on cuneiform tablets from the library of King Ashurbanipal of Assyria (668—c. 627 B.C.).The recipe instructs the glassblower: Collect small white pebbles from the riverbed; then crush and sift them into a fine powder. Take ashes of the *naga* plant and grind and sift them. Mix together in a pan ten *minas* (a unit of weight equaling about a pound) of the crushed pebbles, and ten *minas* of the powdered ash. Heat the mixture in a furnace until it is the color of "a ripe grape." Remove and allow to cool. This is *zuku* (an intermediate, partially melted glass). Crush the *zuku* and add a small amount of "fast copper" (to color the glass). Then heat the mixture again for a long time. The result is *tersitu*, an artificial lapis lazuli.

Glassware in Venetian style: all but one are 17th century; goblet at left is 19th-century German.

The formula is ancient

Robert Brill has visited a one-room glass factory in Herat, Afghanistan, which still follows this formula today, making small tumblers and vases. Modern chemical analyses have confirmed that ever since glass was made in that part of the world, these same materials have been used.

Man had long been cutting or grinding obsidian or other volcanic glasses (naturally fused by heat from the Earth's core) when glassmaking originated—somewhere in western Asia or northern Mesopotamia, most scholars believe.

The glassmaking industry seems to have evolved from the production of faience, a porous body of finely ground quartz covered with a colored vitreous glaze, that could be worked cold and then fired in a kiln. Faience was being made as early as 4000 B.C. in both Egypt and the Near East. "Perhaps some tinkering by faience makers with the ingredients and temperatures resulted in the manufacture of an actual glass object," says Sidney Goldstein, curator of ancient glass at Corning Museum. "This probably happened sometime in the early second millennium B.C." At Corning, this infant industry is represented by a pendant of the fertility goddess Astarte, which was cast of deep blue glass in the Near East sometime between the 16th and 13th centuries B.C.

Aside from casting glass, the most common technique of forming a glass vessel among the ancients was core-forming, in which molten glass was trailed around a clay and dung core. The roughly shaped piece of soft glass was then rolled ("marvered") on a flat surface, probably stone, to smooth it. During this operation, the glass was constantly reheated so that it could be continually worked. When the piece was cool, the core could be scraped out. Most core-formed objects were decorated with contrasting colors of glass, trailed onto the surface and dragged up and down with a pointed instrument in a feather pattern. The museum holds several core-formed, trail decorated and tooled Persian rods said to have been excavated at the Choga Zanbil Ziggurat near Susa (c. 1200 B.C.). Groups of these rods may have been used to decorate the wooden doors of the temple there.

"The expansion of the Egyptian empire as far east as Syria in the 15th century B.C. apparently gave an enormous lift to the industry along the Nile," says Goldstein. "Suddenly, glass vessels and artifacts of great sophistication and skill begin to appear. The question is: were the Egyptian artisans fast learners or were artisans from western Asia imported to carry out these works?"

In stentorian testimony to that craftsmanship stands the museum's newly acquired head of a king, probably

Photograph by Corning Museum of Glass

Roman blown glass of the first four centuries A.D. makes a luminous display of light and color.

Amenhotep II (1436-1411 B.C.), the earliest known glass sculpture of a pharaoh, which was probably cast with details retouched (p.68). The point to remember for amateur Egyptologists is that this little head (about one-and-a-half inches high), long separated from the rest of its body, its slight smile conveying a sense of irony conceivably born of centuries in the dust, antedates the King Tut lode by nearly a hundred years.

Ancient glassmakers also perfected a time-consuming technique that resulted in what collectors now call millefiori, or mosaic, glass. This was made by bundling rods of multicolored glass into patterns. The resulting bundle was then fused together and drawn out, but the design remained throughout the length of the cane. This cane could then be cut into tiny segments, which were arranged in a mold and heated slowly until they fused to form the object.

When the Egyptian empire declined, after the first millennium B.C., glassmaking gradually shifted back to western Asia. There, the Persians became renowned for their remarkable clear glassware with elaborate cut decoration on the bottom. The Corning Museum holds one of the finest examples of such work, a fifth-century B.C. glass *phiale,* or dish, from the Achaemenid period (p. 69). Aristophanes pokes fun at the preposterous luxury of the Persians who use tableware of this sort in his comedy *The Acharnians* (425 B.C.).

But the big technological event occurred in about 50 B.C., probably in the Levant, under Roman rule: the discovery of glassblowing. Goldstein explains: "Some clever fellow not only noticed that you could expand a bubble of glass with a blowpipe, but also that you could expand that bubble into a mold. So, while it formerly took 45 minutes to core-form a vase, it only took 45 seconds to blow one into a mold. This put glass within the reach of people of lesser means." The predictable result: by A.D. 260, Roman Emperor Gallienus publicly registered his disdain for glass, cringing at its popularity.

In spite of such criticism, glass and its makers continued to improve over the ages. One of the highlights of the Corning collection is the Daphne Ewer, a Roman glass pitcher decorated with a scene from the myth of Apollo and Daphne (p. 68). How this piece arrived at Corning is one of the great stories of museology. Actually, the ewer was purchased (reportedly from a peasant in the Crimea) by J. Pierpont Morgan in 1908. Over the next few years, however, the pitcher mysteriously disappeared from Morgan's collection. It turned up again at a London auction in 1949, where it was recognized by American glass fancier Ray Winfield Smith. Slowly he twisted in his seat at the rear of the exhibit room as other dealers puzzled over the glass and rubbed their fingers along its decoration. His patience and dedication won the day, however, and he raced back to New York to share his coup with a fellow collector, Jerome Strauss. Only because the two marveled over the prize in the early morning hours, Smith missed his flight later that morning to Washington. The upshot: midair collision doomed the airliner and claimed 55 lives. Five years later, Smith sold the piece to Corning, where Daphne is now the highlight of the Roman glass display.

The Middle Ages were known for their stained-glass

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A mosaic glass bowl from Italy or the eastern Mediterranean is from late second to first century B.C.

Ancient vessels: left, from Egypt, about 1400-1360 B.C. Right, eastern Mediterranean, fourth century B.C.

A ribbon glass bowl, Roman Empire, probably Italy, dates from late first century B.C. and is very rare.

windows: flat panes of glass were blown, cut into intricate shapes, then joined with lead strips. The Italian Renaissance saw the rise of the Venetian glassmakers, who had been moved by decree out of the city in 1291 to the nearby island of Murano because their workplaces caught fire with alarming regularity. The thread then leads to much heavier but occasionally fantastic productions of northern Europe. Among other treasures, the museum holds an 18th-century German stag glass that is actually an elaborate joke with a "straw" down the center to enliven an evening's libations.

In England, a technological breakthrough occurred in 1676 when George Ravenscroft succeeded in producing a lead-based "crystal" glass that was clearer and much more brilliant than the traditional soda-lime glasses of the Continent. Into the bargain, this new material was "softer" and so could be cut with far greater accuracy and detail. By century's end, the lead-glass formula of Ravenscroft's Savoy Glasshouse was used throughout Europe.

Beginnings in America

In the United States, the story of glass more resembles a textbook lesson in economics. When English law decreed in 1615 that British timber was to be reserved for ships of the line, glassmakers there were forced to shift to coal as their fuel. Those who emigrated to America were delighted to find abundant forests and sand. Still, several early attempts failed—including two factories at Jamestown, Virginia—for lack of expertise and distance from markets. Slowly, throughout the 18th century, a handful of immigrant craftsmen began to succeed in America.

The first commercially successful glasshouse in America was that of Caspar Wistar, a German emigré, who opened his glassworks in 1739 in southern New Jersey to supply the bottle and window needs of Philadelphia merchants and brewers. Wistar's bold step was in open defiance of the trade acts that attempted to protect British industry by restricting the Colonies to production of raw materials only. Wistar's factory continued to make its usually green, olive and amber products until it closed during the Revolutionary War.

Other successful early American glassmakers, also German emigrés, were Henry William Stiegel, whose fine tableware from his three glasshouses in Elizabeth Furnace and Manheim, Pennsylvania (1763-1774), is prized by collectors; and John Frederick Amelung, who was a trained glassmaker when he arrived in America. His factory at New Bremen, Maryland (1784-1795), turned out the first signed and dated pieces in the New World. His was also the finest glass this side of the ocean, decorated with elaborate copper-wheel engraving.

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A new museum for glass

"Far and away the greatest American contribution to glassmaking was the development of the glass-pressing machine in the 1820s." The speaker is Jane Shadel Spillman, Corning's curator of American glass. "In fact, it was the most important step since the invention of the blowpipe. The machine took two operators: one to bring the gather of hot glass from the furnace and drop it in the machine, and the second to pull the handle and make the impression"—just like making waffles at breakfast. "Cutting off the exact amount of glass took skill, but not nearly so much as blowing an object. Each bowl came out of the press completely decorated in a few seconds. The idea tripled American tableware production in just a few years." It was in good time too, considering the bounty of the young country.

But sheer production alone seldom satisfies either craftsmen or their market for long. As the 19th century progressed, American producers, following the Victorian lead elsewhere, began experimenting with new methods and styles of decoration, including elaborate cutting schemes and special tints and colors for glass parading as other materials, most notably porcelain and silver.

The famous "Peachblow" craze of 1886 is a case in point. On March 8 of that year, a record $18,000 was paid by a Baltimore collector for a porcelain vase the color of "crushed strawberries," said to have once belonged to a Chinese mandarin named Wang Ye. Although the newspapers attacked such an expenditure for this "plug-ugly of ceramic art," at least two American manufacturers raced to turn out reproductions of the work in glass, confident that their techniques could capture the subtle shading of the original. It was an overnight best seller, matching a line of beauty aids also marketed under the name of "Peachblow."

The rush to perfect the secret alchemy of Peachblow was also mirrored in the work of several American craftsmen who began to cross over the line that separates craft from art. The end of the 19th century signaled the entry of the glassmakers into the Art Nouveau movement. Louis Comfort Tiffany began by wowing the critics with his leaded-glass windows and, later, iridescent vases. One of the museum's major holdings is a 1905 leaded-glass floral window that Tiffany made for a Hudson River Valley home.

What Tiffany and Frederick Carder at his Steuben Glass Works in Corning, New York—along with Emile Gallé, René Lalique, Maurice Marinot and others in Europe—were offering was a reaction to the boredom of glass produced by the Industrial Revolution.

That reaction lives on today in the Studio Glass Movement. But it is not just a reaction to the Industrial Revolution. Today's artists are stimulated by the entire sweep of glass history. They are also sensitive to the tension between function and pure esthetics. "Function has been the tail that has wagged the dog of glass art for too long," they seem to cry out through their works. And against all that illustrious history, they have seized onto the idea of fashioning glass in bright new shapes, patterns, colors—totally devoid of utilitarian purpose—which is the great leap that crafts must make if they are to succeed as art. In 1980, nearly 3,500 years into the glassmaker's art, the world is beginning to recognize that glass needn't hold either Perrier or hemlock to be a success. It need only *be*. We can also see—through a glass clearly, to judge from the new Corning Museum—that Man's celebration of that medium has been an enduring one.

Glassblower Leonard Parker is in the midst of forming a large vessel at Steuben Glass, Inc., in Corning.

Contemporary works are hands by Joel P. Myers of Illinois; discs by Pavel Hlava of Czechoslovakia.

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Eating crow is not our favorite gastronomic experience.

But we've recently discovered that hearing you out, even on very unpleasant matters, can be healthy for both of us.

Last year, for example, Ætna sat down with the National People's Action coalition to digest complaints about the way property

insurance is sold—and *not* sold—in inner-city neighborhoods.

That dialogue produced results you should appreciate.[1] Just as other consumer contacts have encouraged changes like our Privacy Protection hotline. And the new, lower-cost Æconomaster life insurance.[2]

Our 91,000 discussions last year with often less-than-chummy consumers indicate, however, that there are still answers we haven't found.

A lot of you aren't happy about who pays what for auto insurance. So we're taking another look at how rates are figured by age, sex, and marital status.[3]

And absolutely *none* of you out there is happy about steadily-rising health care costs. Which is why we're taking a hard look at the entire health care system, including health policies themselves.[4]

The point is simple: *If we're going to offer the kind of insurance you need and want today, we have to listen—and not just to what we like to hear.*[5]

Ætna may not agree with your every gripe. If not, we'll tell you so. But we promise you'll get action, not words, when we do.

Ætna wants insurance to be affordable.

1 Talks with the NPA—a consumer coalition of over 100 inner-city neighborhood groups—led to a three-fold test program now underway in sections of Chicago, Cleveland, New York, and Philadelphia. We're encouraging agents there to help us write more homeowner's insurance. In two of these cities, we're offering a new "Home Value Policy" that makes inner-city insurance affordable. And we've put up a $225,000 grant to help reclaim rundown areas, backed by a commitment of up to $15 million in higher-risk urban development loans.

2 The hotline is just the most recent expression of our long-standing concern. If you want to know what information we have about you on file, just ask. If you tell us something's wrong, we'll reinvestigate and respond. As to Æconomaster, it not only offers lower premiums to start with, it can lower them even further when interest rates go up—a hedge against inflation.

3 Our studies so far show that about half of you think the traditional rating criteria are unfair. When told that new criteria could mean more money out of your pocket, however, only about a third still thought change was a good idea. In the real world, decisions often involve some tradeoff between costs and benefits. What we have here are two problems to solve at once.

4 Ætna recognizes we've helped fuel rising costs by selling health insurance that doesn't always give the consumer a reason to be concerned about them. Deductibles and co-insurance while effective aren't always popular. Unfortunately we too often give the customer what he wants without looking at the tradeoffs. We also haven't done enough to educate people to take better care of themselves or know when they're sick. Prevention is still cheaper than treatment.

5 It's now company policy to invite representatives from groups like the National Consumers' League up to Hartford. And Ætna now has 21 of its own consumer representatives who respond to your questions, suggestions, and complaints—somewhat unusual for an industry that's spent the last hundred years mostly listening to itself.

Ætna Life & Casualty,
151 Farmington Avenue,
Hartford, CT 06156

Ætna
LIFE & CASUALTY

Posing as the 18th-century encyclopedist and philosopher Denis Diderot, Professor John Rassias

By Richard Wolkomir

A manic professor tries to close up the language gap

Americans lag in learning other tongues, but a Dartmouth teacher's histrionic method is helping students to master them faster

barks at his Dartmouth advanced class in French literature while explaining a Diderot satire.

In a Dartmouth College classroom, six New York City transit policemen recite in unison: *"¡Ay Dios mio!"* Their instructor, a specially trained fellow officer, raises his arms like a choir director and the chorus repeats: *"¡Ay Dios mio!"*

Feinting, the instructor looks to the left, then abruptly snaps his fingers at a man sitting to his right. The man repeats, solo: *"¡Ay Dios mio!"*

Why are big-city policemen at an Ivy League college in New Hampshire chorusing "Oh my God!" in Spanish? They have come to learn—quickly and effectively—how to communicate with New York's 2.6 million Spanish-speaking citizens. And, in the process, they are demonstrating the potency of a high-voltage method of teaching foreign languages that could help to improve international relations.

Behind it all is John Rassias, a burly 54-year-old Dartmouth language professor with a bass voice, curly black hair, a lopsided grin, a boxer's nose and a wild teaching style: he hurls chairs against walls, breaks eggs over students' heads, rips his shirt to symbolize freeing of the self, and harangues his classes in French while dressed as an 18th-century philosopher. His classroom style is unique. But his method is now used in the teaching of all languages at Dartmouth and at more than 38 other schools.

While enrollments in language classes nationwide have dropped steadily over the past ten years, Dartmouth's language enrollments have grown substantially. And tests at Dartmouth and at other schools using this method show that it yields results far superior to those of traditional teaching methods.

Teachers from high schools and colleges elsewhere, propelled by the country's alarming language gap, are going to Dartmouth to observe the technique.

Just before World War I, 36 percent of all U.S. students at the pre-university level studied a modern foreign language. Today, only 15 percent take a foreign language, and fewer than five percent ever reach the third year. One-fifth of all U.S. public high schools now offer no foreign language courses at all. Among other lamentable results:

Frenchmen had a good chuckle a few years ago on reading claims that Pepsi-Cola threw cold water on friendship. Chagrined company officials—who had intended the message to be "Pepsi is the refreshment of friendship"—promptly yanked the ads.

Cars with interiors marked "Body by Fisher" were advertised in Belgium with this unintentionally ghoulish translation: "Corpse by Fisher."

Some 10,000 English-speaking Japanese businessmen now operate in New York City alone, but of some 900 American business people in Japan, only a handful speak even rudimentary Japanese.

Government foreign-affairs agencies are worried that declining foreign-language enrollments in our schools will lower the quality of new recruits for their services and increase their language training costs ($100 million in 1978). Only eight percent of U.S. colleges and universities now require a foreign language for admission, down from 34 percent in 1966.

In 1978 the President established the Commission on Foreign Language and International Studies to

The author, who wrote about the Sterling Institute in the November 1979 SMITHSONIAN, *gets by with English and halting French.*

Photographs by Bill Ray

analyze the problem. In November 1979, the commission members (including Dartmouth's John Rassias) reported that our neglect of foreign language and civilization studies hobbles the country in diplomacy and international trade. "Americans' incompetence in foreign languages is nothing short of scandalous, and it is becoming worse," they charged.

The commission suggested steps that range from reinstating college language requirements to creating high schools that specialize in languages and foreign studies. But the report emphasized: "The decline in foreign language enrollments is in large measure a response to poor instruction."

Now an increasing number of language teachers see innovative approaches to teaching as a way to add vitality to their classrooms. In fact, says John Rassias, his method actually is a reaction to the dismal language teaching he encountered as a student.

The son of immigrants, he learned to speak Greek first, English second. From his earliest days, he associated languages with "the sights, the sounds, the smells, the warmth" of the Greek community in Manchester, New Hampshire, where he grew up. Then he was burned in an accident that left him bandaged like a mummy. For nine months he couldn't see. "I knew people by their voices," he says. "From their tones I could discern happiness, I could discern sorrow —so language early became almost mystical for me."

In high school, his romance with languages ended. For one thing, his French textbook was populated by cardboard Parisians who chattered endlessly about the weather and misplaced pens. There were other drawbacks. One day, to force him to pronounce the letter "r" as the French do, the teacher used a pencil as a tongue depressor. "I couldn't help myself," he says. "I bit her." Today he keeps the same brand of pencil on his desk at all times. It reminds him of what to shun in teaching languages.

Languages must be spoken, he believes. But in a traditional class each student can speak no more than four times during the period. "That's like learning mathematics without examples," says Rassias. He also insists that reliance on vapid textbooks actually hinders a student's progress. Furthermore, the atmosphere in too many language classes is soporific—"Valium Valley," he calls it.

By the time he was graduated from high school, he was "completely turned off by languages." As a Marine stationed in postwar Japan, he found that—unable to speak Japanese—he wandered the country like a phan-

Keeping class lively, Rassias cracks egg on student's head, strides off to confront someone else (right).

tom, cut off from the people, baffled by their culture. Suddenly his fascination with languages rekindled.

A civilian again, he earned a degree in French at the University of Bridgeport in Connecticut, then studied in France for two years on Fulbright scholarships. At last he was a teacher himself, ready to fire others with his own zest for language. The results were depressing: "In the classroom I felt that I really wasn't doing much, that I wasn't making much of a difference in people's lives."

Dejected, he turned to a second love, the theater, and went back to France, this time to study drama. He earned a doctorate, and began to act professionally in Paris. But teaching was on his mind.

"One day I had this interesting thought—why only teaching? Why only acting?" he says. "Using acting techniques, couldn't a teacher improve his ability to communicate?"

He returned to the University of Bridgeport as an instructor, determined to create a new teaching system. When the Peace Corps asked him to help improve its language courses, he had his chance. The result, much refined, is today's "Dartmouth Intensive Language Model." In action, it looks like a Gene Kelly dance number speeded up.

Behind the madness is artful calculation

The scene: a Dartmouth classroom. A group of undergraduates are watching their instructor, Marty Peterson, a senior from Lake Forest, Illinois. She is an "apprentice teacher," trained to conduct drills.

For a moment she studies a script in her left hand, a professor's outline of what he wants her to teach that day. Then she erupts into action, leading the class in choral renditions of sentences to be learned, zigzagging among the desks.

Looking one way, she points at someone across the room, snapping her fingers for a recitation. If the student answers correctly, she blows a kiss. If incorrectly, she stabs the offender with an imaginary stiletto, snaps at another student for the answer, then snaps again at the student who got it wrong.

Her finger-snapping gives the class a jivey beat as she paces the room, now standing, now stooping to eye level with the students. When a girl has trouble squeezing out an answer, Marty drops to her knees, smiling encouragement, trying to pull out the answer with her hands. The girl gets it right? She earns a *très bon!* and a hug. Marty jumps up and, finger-snapping and whirling, leads the class on to new material.

"You could mistake the atmosphere of this teaching method for fun," she later tells a visitor.

Actually, John Rassias has carefully choreographed every move and gesture in the apprentice teachers'

A head-hug from Rassias rewards another student's good response to a high-voltage query.

repertoires. And behind his own madman antics are hours of painstaking rehearsal at home. His madness conceals artful calculation.

His strategy is to maximize the number of times each student speaks aloud in the new language. Thus, language classes at Dartmouth are limited to 22 students per section. Every day, for 50 minutes, each section meets with a master teacher, a Dartmouth professor who explains the day's lesson. Using the method's fast pace and dramatic techniques, the professors pronounce new material for the class, explain grammatical points and clarify the lesson.

Next, the section breaks in half, each half spending 50 minutes with an apprentice teacher, an undergraduate trained in the Rassias method. Finally, the students go to a language laboratory for further practice, monitored by another trained undergraduate.

"But do you know how much homework they have? Virtually zilch!" says Rassias. "Instead of doing homework, they spend extra time in class, speaking." And one of the keys is the intense drill sessions with apprentice teachers.

At the beginning of each term, Rassias holds a three-day workshop for students interested in apprentice jobs. A recent workshop was typical—250 candidates turned out for the approximately 30 slots open. Balancing precariously on chair arms and prowling bearlike among the candidates packing the auditorium, Rassias said, "From now on we're going to be in a fishbowl!" Observing them that night were teachers from high schools in Rhode Island and Massachusetts. "All *right*—let's go!" he exclaimed. And he out-

Prostrating himself, the teacher tries to convey that the class should penetrate "the soul of Diderot's writing," rather than being content to focus only on the "dry bones" of the words.

lined for the audience the rudiments of the method.

First, in all language classes, the only language spoken is the language being taught. To introduce new words, the master teachers act them out, rather than speaking in English, he said. Second, to make sure that each student speaks 65 times per 50-minute session, apprentice teachers must hustle the class along, snapping their fingers to maintain the rhythm.

After the workshop, Rassias tells the visiting high school teachers how they can adapt the method. For instance, given a 45-minute period, they can spend the first 25 minutes presenting the basic lesson. The remaining 20 minutes are for drill, perhaps led by an advanced high school student.

It's also important, he says, how teachers stress the five facets of learning a language: grammar, comprehension, vocabulary, fluency, accent. Commercial schools usually stress vocabulary, while many academic teachers stress accent. Rassias gives the most weight to grammar and the least to accent.

"I don't mean that we allow students to use an English pronunciation," he says. "But if you spend too much time harping on accent you cut people off at the pass, make them afraid to speak. If, without humiliating you, I can get you to speak even the most extraordinarily wrong thing, in the beginning I'll reward you with as much enthusiasm as if you were receiving the *Légion d'Honneur*. I tell my students, 'Have the courage to be bad, to make mistakes—but speak!' "

To encourage speaking, Rassias has devised an arsenal of techniques, such as make-believe press conferences and other skits. The New York City transit police-men learning Spanish at Dartmouth found themselves in an imaginary subway station. A heart attack victim lay on the platform, two men were picking his pockets, a crowd watched in silence. The policemen were taught how to deal—in Spanish—with the situation.

Dartmouth drill classes write their own skits in the language they are studying. They wear costumes and lug in props. Rassias, who has (to say the least) an affinity for the spotlight, once vivified a skit about the fall of Troy with anachronistic special effects: the recorded whine of falling bombs, flashing lights as they exploded, puffs of smoke.

To master counting, students may call off the numbers on rapidly rolled dice. Or they may play a game called "dots": as students call off the numerals, the teacher connects a series of numbered dots on the blackboard to spell out a word.

In a vocabulary drill, the instructor gives students a cue sentence, such as "I haven't eaten; therefore I am hungry." Then the instructor may say, "I haven't drunk," and point to a student to complete the sequence: "Therefore I am thirsty."

Into all classes, teachers inject culture. One technique is the "micrologue," a minute-long monologue on anything from French crêpes to Romanian agriculture, depending on the language under study. The teacher repeats the micrologue three times, while students write it down. Then students must repeat it for their classmates and answer questions.

After ten weeks studying a language, Dartmouth students can opt for the "Language Study Abroad" program. Better than half do. Students spend several

months in a country where the language is spoken, living with a local family.

"One of our favorite tricks is to drive these kids out on a Friday and sort of parachute them into obscure villages lost in the countryside, which no one ever heard of," says Rassias. "They have no money and they have to get by for three days by making friends and earning their keep. Then they have to come back with a complete oral and written report on the village's history, economy and social pecking order."

Most students are positive about having fellow undergraduates as drill instructors. Michael Cooper, a freshman from New York City, says: "Students tend to be intimidated by older people, by professors, and so when you have an instructor who's much closer to your age I think you open up more."

Teachers in other schools increasingly are adapting the Dartmouth model to their own classrooms. The Exxon Education Foundation—calling the method "an educational innovation of demonstrated merit"—from 1976 to 1978 disseminated information about Rassias' method and provided funding for some colleges and universities to adopt it.

Meanwhile, jolted by the report of the President's Commission, the nation's education system may be poised for a renaissance in language studies. Already straws are in the wind, and here are a few:

In three towns along the Vermont-Quebec border, with federal funding, an English-French bilingual educational program is offered to all children, beginning with 4-year-olds. In Burlington, Vermont, the high school's seven-year-old "total immersion" program has students spend most of one semester off-campus, taking all subjects—from history and art to science—in French, then spend a month in France or Quebec.

Vaporizing the language barriers

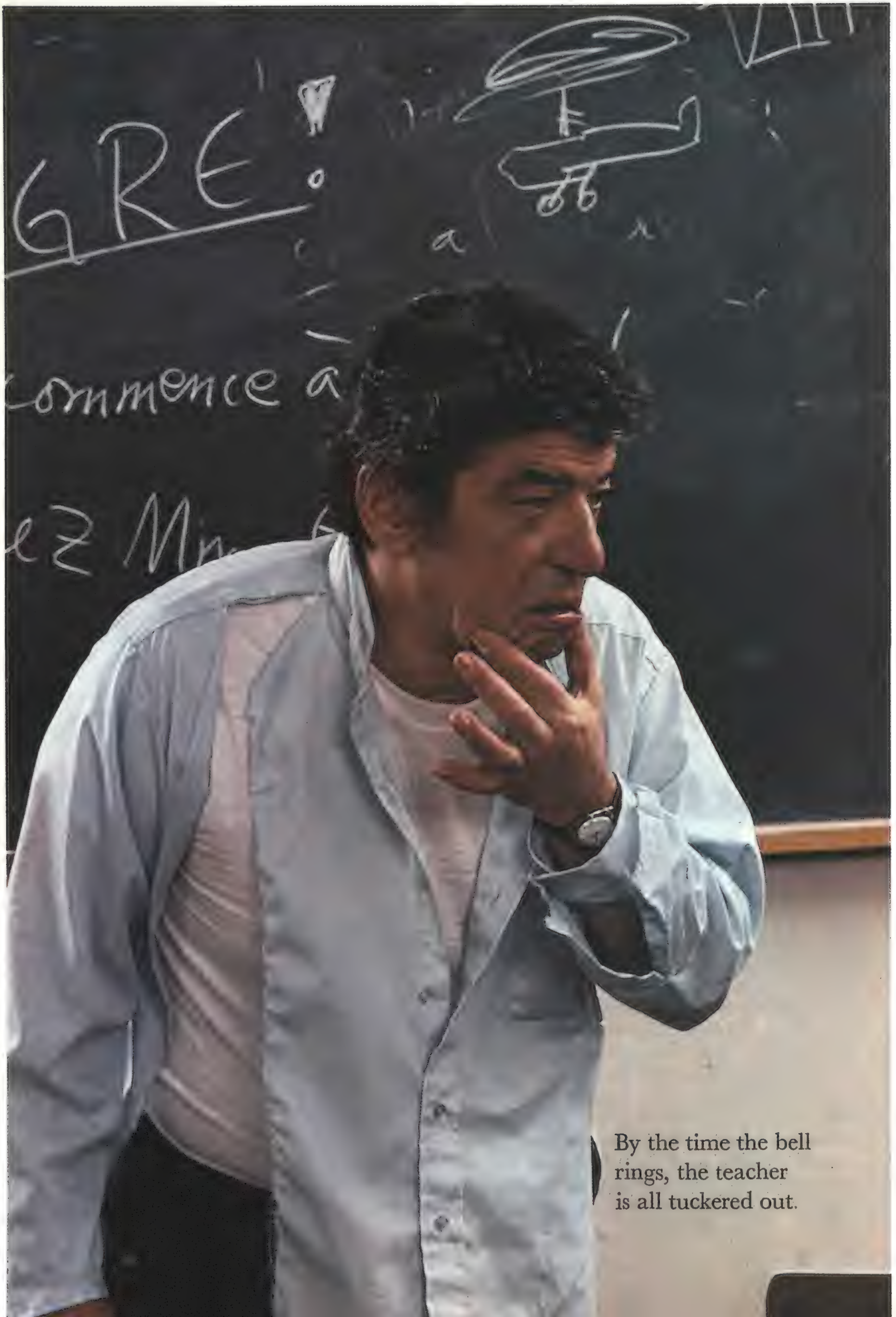
In Philadelphia, 14,000 pupils in grades four to six, in 85 city schools, are taking Latin; Los Angeles has a similar program. A high school in Jamaica, New York, now offers nine languages, including Hebrew, Chinese, Russian and Greek.

Bilingual programs are springing up in schools nationwide, in response to the influx of students who speak Spanish, Vietnamese and other languages.

Meanwhile, at Dartmouth, Rassias continues to astonish his students, appearing one day as Denis Diderot, another as an ornately robed Chinese emperor, cold cream splotching his face to simulate leprosy.

"What we're doing is extremely simple," he says. "We're giving people the desire to communicate with others, to understand others, to be sensitive—we want to aim some big educational ray guns at these stupid language barriers and vaporize them, poof!"

He mock-strangles a boy to clear away inhibitions about being punished for failure; kneels coaxingly, zaps student. Along the way, Rassias tore his shirt.

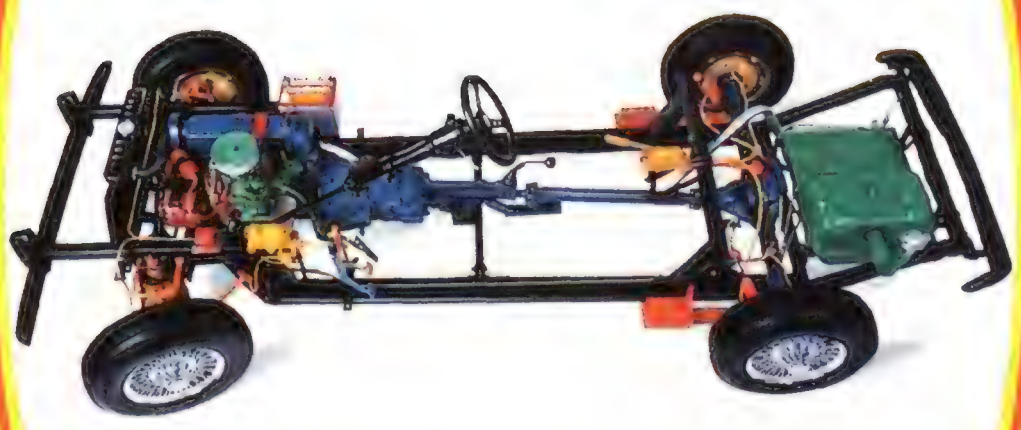


By the time the bell rings, the teacher is all tuckered out.

Shell Answer Series #23

HOW YOUR CAR WORKS

A guide to the understanding and care of your car



by Howard Schmitz, Shell Automotive Expert

Come to Shell for answers

Understanding how your car works can help you keep it working better

©1980, Shell Oil Company

This guide won't turn you into a mechanic, but it will help you understand your car and why it's important that you follow the maintenance schedules in your owner's manual. It can help you spot problems in advance and talk more knowledgeably with your mechanic.

To illustrate the inner workings of a car for you, we built a small car. We took photographs along the way, to give you an inside look at what makes a car work.

Q. What happens when I turn the key?

A. When you turn the key to start the engine, two things happen:

1. Cranking — The starter motor cranks the engine, moving the pistons inside the cylinders. The motion of the pistons sucks a mixture of air and gasoline into the engine.

2. Ignition — The ignition system puts a spark to this mixture, and the engine starts running.

These are the things that are *supposed* to happen when you turn the key. Help make sure they *do* happen by always keeping enough water in your battery and by keeping the battery connections clean and tight.

About the author

Howard E. Schmitz is a chemical engineer. For most of his 38 years with Shell, he worked on research and development of industrial lubricants and engine oils. Now, as a consultant to the advertising department, Howard is primarily responsible for the technical accuracy of statements and claims made in Shell advertising.

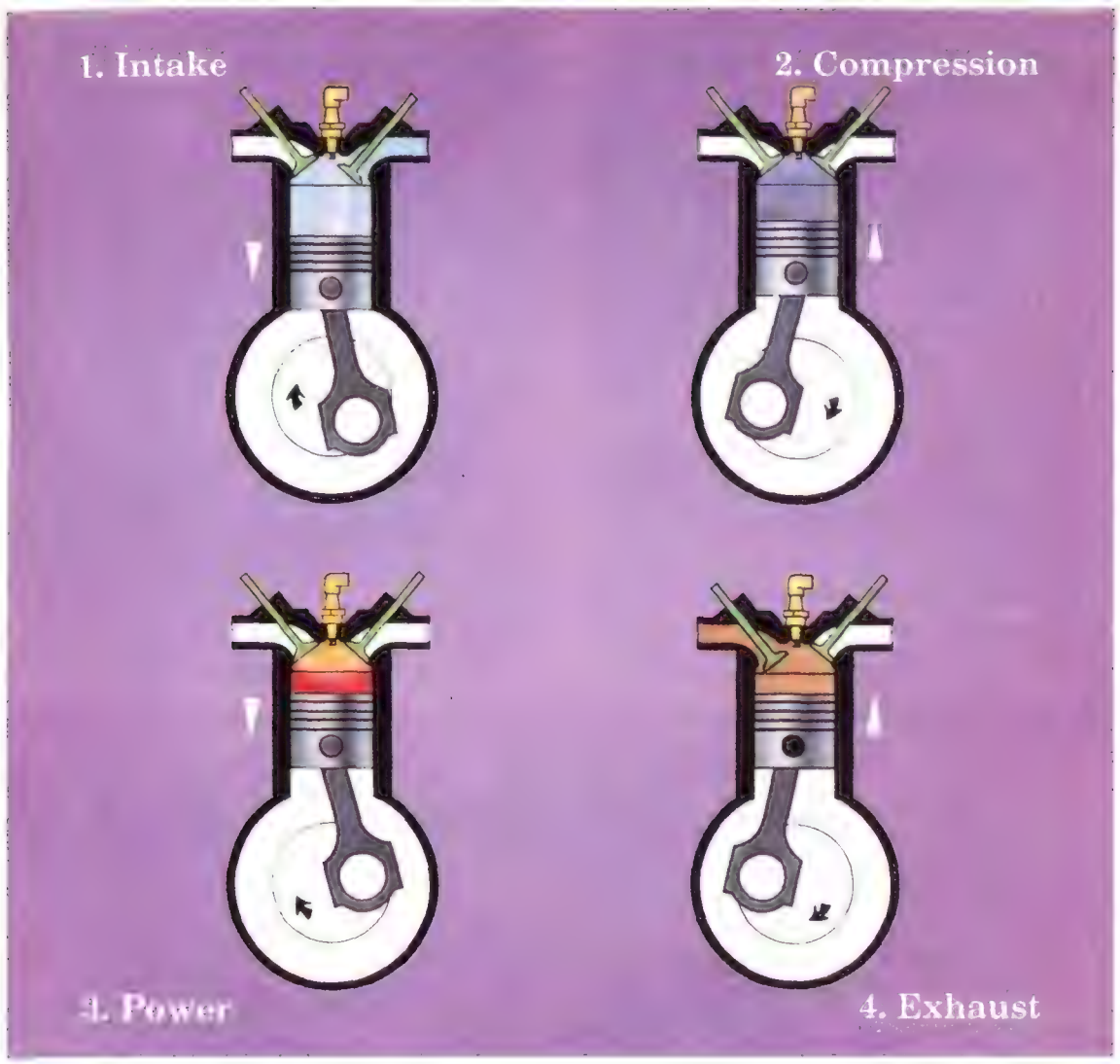
Q. How does the fuel reach the cylinders?

A. The fuel pump draws gasoline from the tank, through the fuel line. The fuel goes through a filter to remove any dirt and rust; then it goes to the carburetor (or fuel injectors).

The carburetor mixes the correct amount of gasoline with the air being drawn into the cylinders. When you step on the gas pedal, the carburetor throttle opens to let more air/fuel mixture into the engine.

If too much gasoline enters the cylinders during cranking, the engine is "flooded." Holding the gas pedal down will help start it.

NOTE: A clogged air filter robs power and wastes gas. A dirty fuel filter can cause hard starting and rough running. Change filters as recommended by your owner's manual.



Q. What powers the pistons?

A. Explosions in the cylinders. Here's how it works:

1. Intake—The camshaft opens the intake valve. As the piston moves down, the fuel/air mixture (blue) is drawn into the cylinder through the valve.

2. Compression—As the piston moves back up, the intake valve closes and the fuel/air mixture is compressed into a small volume around the spark plug.

3. Power—The spark plug sparks, igniting the mixture. This explosion (red) forces the piston back down. Piston rings form a seal to prevent leakage of expanding gases.

4. Exhaust—The camshaft now opens the exhaust valve. The piston moves up, forcing the waste products from the explosion out through the muffler and tail pipe.

A weak spark will sometimes fail to ignite the mixture. This causes "missing," loss of power, poor fuel economy and excessive pollution. Missing can cause a popping noise in the exhaust. These are indications that you need a tune-up.

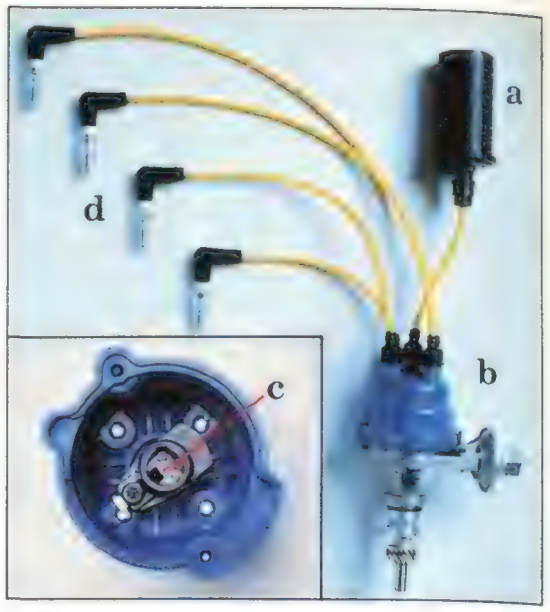
Lift these advertising pages out by removing staples.

Q. What makes the spark plugs spark?

A. Electricity from the battery. Your battery provides 12-volt electricity, but spark plugs need over 20,000 volts. So a "coil" boosts the voltage.

Then the electricity is sent to the distributor which acts like a card dealer, passing out current to each of the spark plugs at exactly the right moment. (See inset, right.)

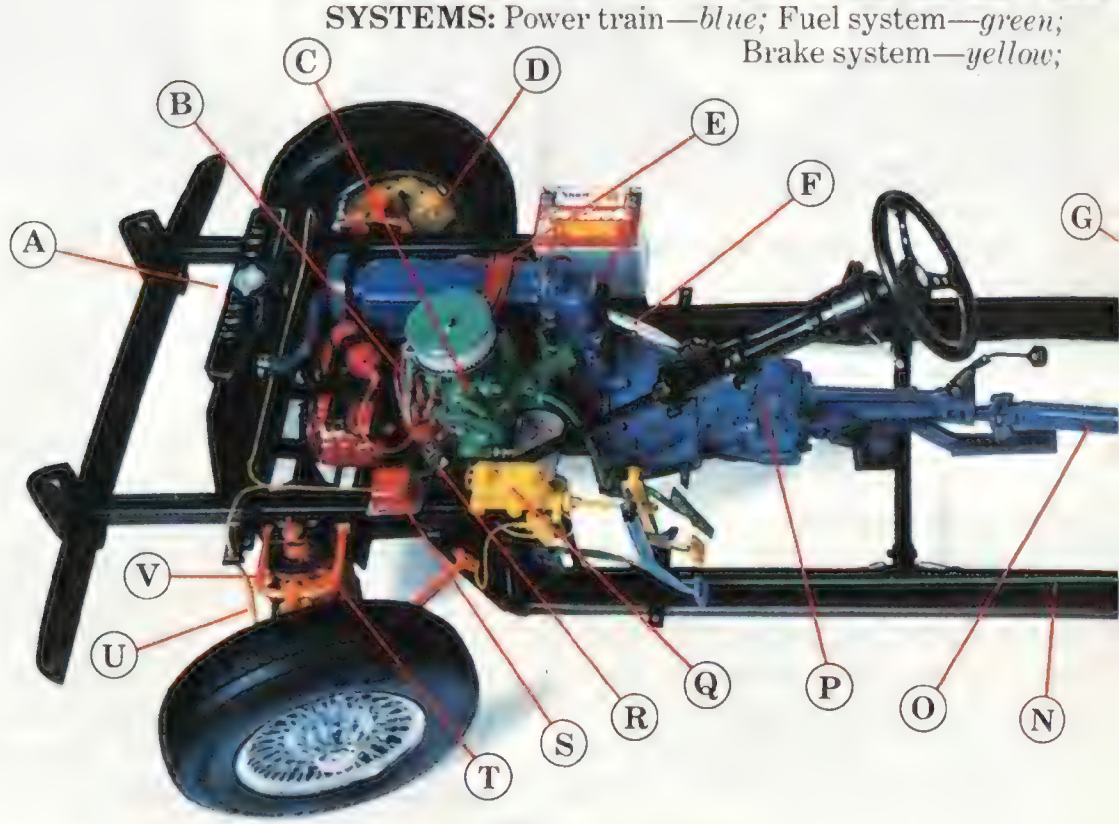
If you hear a metallic rattling noise ("knock" or "ping") as you accelerate, your plugs may be firing too soon. Sluggish performance and poor fuel economy could mean they're firing too late. Have the timing checked if you notice these symptoms.



***Coil** (a) boosts voltage, sends current to **distributor** (b). **Rotor** (c, inset) sends current to **spark plugs** (d) in turn.*

THE ANATO

SYSTEMS: Power train—*blue;* Fuel system—*green;* Brake system—*yellow;*



Q. Why don't the spark plugs drain the battery?

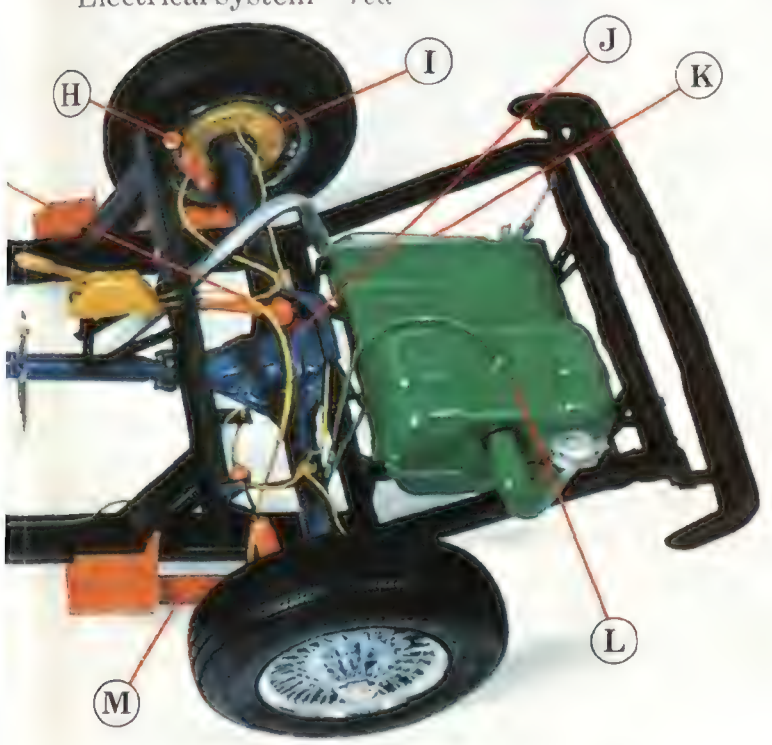
A. While the engine is running, the battery is constantly recharged by the alternator, which is driven by a fan belt. To make sure the battery isn't damaged by overcharging, the voltage regulator monitors and adjusts the alternator's output.

If your ALT or GEN light stays on while you are driving, something is wrong with the charging system. It could be a bad alternator, a loose or broken belt, a faulty voltage regulator, perhaps a loose or disconnected wire. Have it checked out before a dead battery leaves you stranded in the middle of nowhere.

To help avoid a dead battery, check the alternator belt every month or two. If it's loose enough that you can turn the pulley by hand, have it tightened. If it looks worn or frayed, have it replaced.

MY OF A CAR

Suspension system—*orange;* Exhaust system—*silver;* Electrical system—*red*



COMPONENTS:

(A) radiator
(B) fuel filter
(C) carburetor
(D) front disc brake
(E) engine
(F) exhaust pipe
(G) parking brake cable
(H) shock absorber
(I) rear drum brake
(J) differential
(K) muffler
(L) fuel tank
(M) rear leaf spring
(N) fuel line
(O) drive shaft
(P) transmission
(Q) master cylinder
(R) fuel pump
(S) voltage regulator
(T) upper control arm
(U) brake lines
(V) front coil spring

Lift these advertising pages out by removing staples.

As I push the pistons up and down inside the cylinders, the crankshaft turns. It's like pedaling a bicycle. Your legs go up and down, and the pedals go around.

Q. Why does the transmission have different gears?

A. The faster the engine turns, the more power it can make. The lower gears let the engine turn faster for the extra power needed to accelerate from a stop or climb a steep hill. High gear lets the engine slow down a bit for longer life and better fuel economy, while giving enough power for highway speeds. If you have an automatic transmission, check the fluid level every six months.

Q. What in the world does the differential do?

A. As you go around a curve, the differential lets the outside wheel turn faster than the inside wheel, because the outside wheel has farther to go.

But the differential won't drive both wheels if one slips. If you're stuck, put something under that tire for traction, or gently apply the parking brake and gas at the same time.

When you turn, the differential lets the outside wheel turn faster, because it has farther to go.

***Disc** brakes "grab" the disc to slow the car, as I'm demonstrating here. **Drum** brakes have **shoes** that press against the inside of a round drum.*

Q. How do the brakes work?

A. When you step on the brake pedal, you send hydraulic fluid through pencil-thin brake lines to the wheels. The pressure of the fluid forces the brake shoes against the rear wheel drums and the disc pads against the front wheel discs. This friction slows the car.

Eventually the friction will wear

down the brake shoes and pads, and they will have to be replaced. If you hear funny noises when you put on the brakes, like high-pitched squeals, grinding or clicking, please have your brakes checked.

If your "BRAKE" warning light comes on when you apply the brakes, you might be low on fluid, or you might have air bubbles in your brake lines or worn hydraulic cylinders. Have it checked out. Brakes can be a matter of life or death.

With the front wheels straight ahead, see how far you can turn the steering wheel without moving the front wheel. If there's more than two inches of free play, have your steering checked. (With power steering, engine should be on.)

Q. How does the steering wheel turn the wheels?

A. When you turn the steering wheel, it turns gears inside the steering gearbox. The steering gears move rods connected to the front wheels.

With power steering, turning the wheel directs high-pressure fluid to a hydraulic cylinder, which reduces the amount of effort needed to turn the wheels. If you have power steering, check the fluid level regularly.

Have your front wheel alignment checked once a year. Proper alignment can prolong tire tread life and make your car safer.

Oil and water—your car can't live without them

The right kind of oil does many things for your engine. It cuts friction to protect moving parts. It forms a seal between the piston rings and cylinder walls. It helps reduce engine heat and prevent rust. High-grade detergent oil also helps keep the engine free of damaging sludge and lacquer.

Check your oil every time you fill up, and *change* the oil and filter according to your owner's manual. Use a grade and type of oil recommended by your manufacturer.

Water carries away combustion heat and keeps the pistons and cylinders from being damaged. When it gets hot enough, the thermostat opens to send water through the radiator, where it's cooled by the air, then recirculated. Air-cooled engines need no water, but the condition of the fan belt is critical.

Most modern cars use a half-and-half mixture of water and glycol antifreeze to help prevent freezing, overheating and rust.

Q. How can a car ride smoothly on a bumpy road?

A. That's the magic of the suspension system.

Cars today have "independent suspension" in front. This means each wheel is independently supported and sprung, so a bump at one wheel is not transmitted to the other.

Springs support the car's body

and keep it fairly level by compressing and rebounding to allow up-and-down wheel movement. "Sway bars" keep the car from leaning too much on curves. Shock absorbers reduce bouncing. If you notice prolonged bouncing after hitting a bump, have your shocks replaced.

Q. Any more questions?

A. If you have other questions about how your car works, you can check out excellent manuals at your library, ask your mechanic, or write to me: Howard Schmitz, Shell Oil Company, P.O. Box 61609, Houston, Texas 77208.

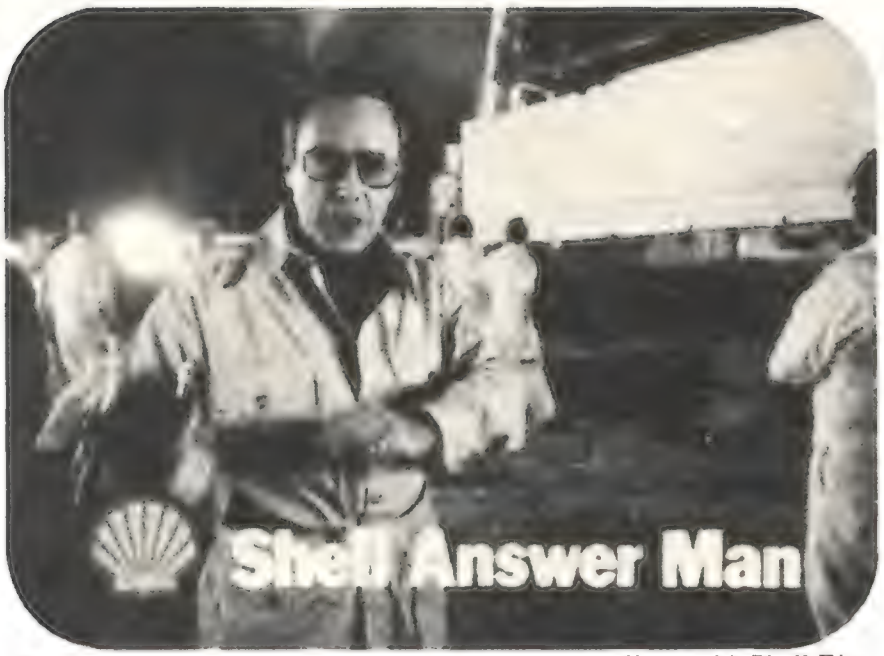
How to get more answers from Shell. *These and other Shell Answer Books are available at many Shell dealers. Or you can write Shell Answer Books, P.O. Box 61609, Houston, Texas 77208.*

Are you using the right oil?

Put Shell Fire & Ice® in your engine and stop worrying. It helps protect your engine from 10° below zero to 100° above. And it's been reformulated to give you even better gas mileage than before. Diesel owners: Shell single weight X-100 is the recommended grade for virtually all passenger car diesels.

Come to Shell for answers

Smithsonian



The freezer. There's a Ford Granada in that block of ice – with Shell Fire & Ice motor oil in its crankcase. After we chopped through the ice, we turned the key. The engine started in four seconds.

The oven. Same test car, same Shell Fire & Ice, towing a 30-ton crane in the Mojave Desert 36 hours later. The oil temperature hit 270°F (well above normal). But Shell Fire & Ice protected the engine.

From the freezer to the oven in 36 hours: The Shell motor oil that had to earn its name.

Take a new Ford Granada and ask it to crank up fast, frozen in a huge block of ice. Then, after you've thawed it out, ask it to pull a 30-ton crane through several miles of Mojave Desert.

Do that and you aren't just asking the car to perform. You're demanding peak performance from its motor oil.

A frozen Ford gets a quick start

Shell Fire & Ice® 10W-40 is an *all-season* motor oil. And an all-season motor oil should be able to help cold engines start fast.

Enter "the freezer."

First we built a special mold to hold our Ford Granada.

Then we put it in a gigantic freezer at zero degrees and sprayed in gallon after gallon of water. Layer by layer, the water was frozen around the car.

Inside the Ford's crankcase, the oil temperature dropped to well below freezing.

When we removed the walls of the mold, the ice was so solid that it took us an hour with two pickaxes to hack our way into the passenger compartment.

Finally, we turned the key.

Immediately, the engine cranked. In four seconds, it started. We'd gotten our Shell Fire & Ice All Season Motor Oil down to subfreezing, and it *still* helped the engine start fast.

"The Oven"

An all-season oil also has to protect when the going gets hot. And the going that gets an oil the hottest is towing a heavy load.

So after we'd defrosted our test car (a 36-hour task), we hooked it up to the crane we'd used to lift the ice block out of its mold.

The crane weighed in at over 60,000 pounds—the Ford Granada, a mere 3,500 pounds.

We started towing. By the time we'd gone several miles, the oil temperature had hit 270°F. Well above normal.

Did Shell Fire & Ice protect? We tore the Ford's engine down the next day for a closer look. And after carefully examining its critical parts, our technical experts had the proof:

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So change to Shell Fire & Ice 10W-40 Motor Oil today.

Shell

By Vincent Marteka

Words of praise– and caution–about fungus among us

Wild mushrooms are stunning, varied, fecund and they have remarkable life-styles, but please, please *don't eat the toadstools*

Like a sturdy parasol, *Hygrophorus coccineus* (shown triple life-size) juts from the floor of a California redwood forest. Microscopic spores for reproduction grow on gills beneath its cap.

"You people live dangerously," we gatherers of wild mushrooms are told. Well, yes and no. Like the sword-swallower, it behooves us to know what we're doing. The key to safe eating is *identification:* What is the shape of the cap? Its color, size, texture? Does it have gills? A ring? Is it growing on a log or the ground? There are no substitutes for the rigors of learning how to recognize the edibles from the non-edibles, but *ah,* the culinary delights of having learned! Besides, even if you are never tempted to taste one, the complexity and beauty of wild mushrooms make them fascinating to study—or just to look at.

Sparked in part by a new interest in natural foods, there are increasing numbers of mushroom hunters heading for the woodlands and fields. Many of them are graduates of the overflowing mushroom-identification classes at universities and colleges—waiting lists are long. Others have joined mushroom clubs that are springing up in different parts of the country. In Connecticut there are now three; not long ago there was none. The Puget Sound Mycological Society in the state of Washington has 1,000 members. In addition to conducting identification and gathering hikes called forays (right), clubs work closely with local poison-control centers, where they identify toxic species and disseminate information on symptoms and treatment of accidental poisoning (SMITHSONIAN, May 1977).

Ever since the first Paleoindian woman in North America spotted a clump of interesting-looking fungi and added it to her collection of plants, nuts and berries for the evening meal, wild mushrooms have attracted—sometimes fatally for the uninformed—Americans of all kinds. The Iroquois Indians are reported to have ranked the pleasure of eating them with that of eating meat. The Zuñis gathered puffballs (p. 104) in great numbers, some to eat immediately and some to dry for winter use. White settlers, too, ate puffballs when they went West.

Toadstools and a grave disaster

The Anglo-Saxons, however, who had come to the American Colonies in the 17th century, failed to share the enthusiasm for wild mushrooms. Their attitude—unbridled fear—has largely persisted in the United States to this day. The British considered nearly all mushrooms poisonous and derisively called them toadstools. Not, of course, without reason. A weathered gravestone at Trinity Episcopal Church in Peekskill, New York, tells a grim story. The inscription recounts the death of William Gould, 35, his wife Sarah, 34, and their four-year-old son Charles, "natives of the town of Noth. Wotton, England," who were "Poisoned by Eating Fungi (Toadstools)." They died on October 2, 1838. I believe this to be the oldest record of death from known mushroom poisoning in the United States.

Huddled around the fruits of their mushroom foray, amateur and professional mycologists sort species.

During the Civil War, many Southerners found themselves eating wild mushrooms in order to survive. The Reverend M. A. Curtis, a 19th-century botanist who lived in North Carolina, observed that many people "found fungi of great importance to them" and noted that he was forced to focus his own energies on gathering "edible mushrooms from which I have gotten many a substantial and luxurious meal."

A major impact on the history of American mushroom hunting was made toward the end of the 19th century by the great migration of mushroom-loving people to this country from Italy, Poland, Russia and Austria-Hungary. Back in the "old country," collecting and eating wild mushrooms was a time-honored tradition. Since childhood they had been taught to distinguish between edible and poisonous species. They could tell the bolete from the morel and the

This article has been adapted from the author's guidebook, Mushrooms: Wild and Edible, *to be published next month by W. W. Norton & Company, Inc. The photographs, however, are* NOT *taken from the book; many mushrooms shown here are* NOT *edible.*

© 1980 by Vincent Marteka

A "hairy" tropical species that grows on dead wood, *Cookeina tricholoma* is from Panama.

Brainlike texture of ridges and pits gives the *Morchella esculenta* its distinctive head. Common name: morel.

Scytinopogon angulisporus, a tropical fungus, has no gills. Its spores are born on surfaces of the branches.

Fingerlike *Microglossum rufum* grows on dead logs. Shown here, it is close to natural size.

Toxic *Gomphus bonarii* thrives in humus on forest floor. The gills appear as ridges.

In the woodlands, *Hygrophorus miniatus* sprouts on moss.

meadow mushroom from the deadly amanita as easily as other people could tell a blueberry from a strawberry. They prepared the mushrooms in a multitude of ways for eating immediately, for pickling in barrels, for drying on long strings over a stove to use later. They found, to their joy, that familiar types from home, like the boletes, were also common here. The names were different, but by these new Americans they were still called *borowiki, steinpilz, porcino.*

Simultaneously, immigrants from Japan and China were settling in California and the Pacific Northwest, bringing with them a rich tradition of wild-mushroom eating. In the early 1900s, Japanese frequently combed the evergreen woods in Washington and Oregon for the matsutake or pine mushroom. The true species did not grow there but a close relative did. They called it the white matsutake.

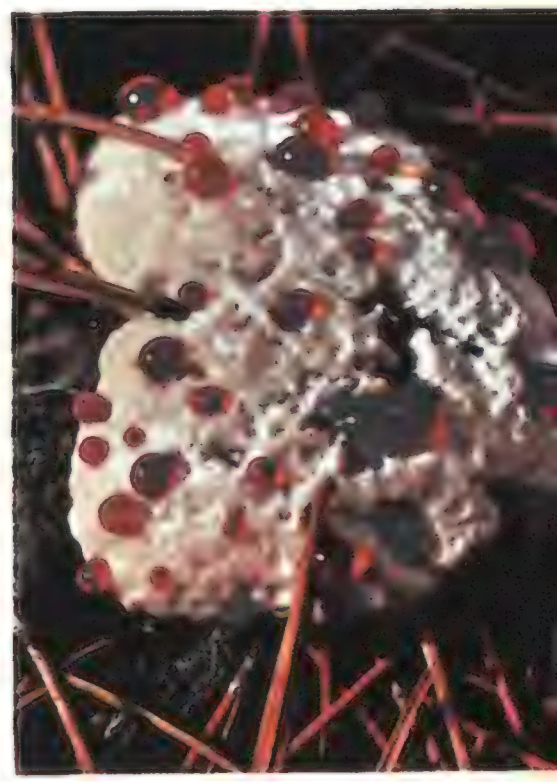
By the turn of the century, interest in wild edible

Clavaria zollingeri, a coral fungus, mimics true marine coral.

Tiers of a *Panellus serotinus* overlap on a deciduous tree.

These examples of the genus *Mycena* are so young that species cannot be determined.

This densely branched *Ramaria araiospora* grows beneath Western hemlock. It was found in Honeyman State Park, Oregon.



Droplets exuded by *Hydnellum peckii* look like costly rubies.

Gills of the *Omphalina luteicolor* are waxy looking and large in relation to cap, which is bent up, hard to see.

mushrooms had spread to nonimmigrants. In Massachusetts, the Boston Mycological Club (BMC), the first amateur group of mushroom collectors in the Western hemisphere, was formed in 1895. To "arouse a wider appreciation of the value of an abundant food which is in America comparatively neglected," the BMC conducted field trips and presented lectures on preparing and preserving mushrooms. The cooking demonstrations were impressive: each affair included mushroom dishes ranging from soups and hors d'oeuvres to entrées and even desserts. A typical bill of fare presented by Mrs. Annie Doughty had 11 choices including "purée aux oréades" (mushroom soup), an entrée of "fricassée aux cèpes" (boletes), and a dessert of "canapés à la Rothschild" (truffles and anchovies). The location of the BMC's headquarters—across the street from where the Boston Symphony played—was a boon to many of the foreign-born musicians who

liked to eat wild mushrooms. Before rehearsals they would rush over with a batch of New World specimens they had collected for a quick identification—and for some delectable dishes.

What are these mushrooms, the objects of so many affections? They belong to that large group of simple plants known as fungi, the most common nonflowering plants on Earth, which range in size from microscopic molds on stale bread to the bracket mushrooms that form three-foot-wide shelves on tree trunks. Unlike green plants, fungi have no roots, flowers, seeds or leaves. With no chlorophyll, they rely on food material produced by other plants and animals.

A mushroom is really just the fruiting part of the plant visible above the ground or wood on which it grows; most of the plant, a network of tiny rootlike threads, is hidden. The sole purpose of the fruiting mushroom is to ensure the spread of another generation of mushrooms by producing minute particles called spores. Amanita spores, for example, are so small that 10,000 can fit into an area the size of a pea. When the humidity of the air changes, mechanisms are triggered to release the spores, which are then blown about by wind currents. Like a scene from a slow-motion film, the spores tumble and fall through the air in a journey so slow that an average-size spore takes more than ten minutes to travel one foot. The cumulative output of spores is staggering: a single meadow mushroom with a cap three inches in diameter will release 1.8 billion spores. A Czech scientist once calculated that an eight-pound fungus brought to the Prague museum produced 1.5 trillion spores. Placed side by side, they would encircle the Earth.

Only a small percentage of spores gives rise to new mushrooms. When one alights in a field with a plentiful supply of food and water, it begins to grow. A bump appears on it, which then elongates into a

Once upon a time, fairy rings like this were said to mark footworn paths of dancing sprites.

A turtle shows its appetite for a *Russula,* but the same mushroom might make a person sick.

Wasp ingested spores of parasitic *Cordyceps.* Spores matured, killed wasp, fungus now grows on remains.

In fact, outward growth of rootlike mycelium from ring's center creates the ever-widening circle.

thread that spreads through the soil, branching into still more threads in a meshlike network called a mycelium. When one mycelium meets another, they merge and clamp together, forming a secondary mycelium, usually the source of the fruiting mushrooms. When conditions are right, say, after a soaking rain, knobs appear on this secondary mycelium and expand as they absorb water and food material, finally thrusting their way to the surface and emerging as the familiar mushrooms.

If the food supply is uniformly spread throughout the soil, a circular "path" called a fairy ring appears on the ground. It is easier to see when the mycelium fruits (left). These circles—and rings of mushrooms—marked the legendary paths of dancing fairies. Each year, mushrooms arise at the leading edge of the expanding circle, which may enlarge for hundreds of years. In undisturbed prairie grasslands in Kansas, biologists have found fairy rings of meadow mushrooms and puffballs that were more than 600 feet in diameter. If the mycelium grew at the rate of 18 inches a year, some of the rings in Kansas were formed soon after Columbus landed in America.

Thunder, lightning and truffles

After a soaking rain or a series of gentle rains, woodlands and fields may explode with fungi. Because mushrooms sometimes seem to spring up overnight, 16th-century observers thought they were created by lightning bolts striking the ground. The early Greeks believed that thunder made truffles.

The strength of expanding mushrooms can be enormous. When the cells stretch they sometimes act like hydraulic rams that create a slow but steady pressure against the object above the growing knob. Fruiting mushrooms have pushed their way up through a three-inch layer of asphalt and lifted casks in a winery right off the cellar floor. In England, an 83-pound stone slab two feet wide was torn from its cemented base and lifted two inches off the ground. Beneath the stone were what looked like two small meadow mushrooms balancing it at the center. Dramatic mushroom power is described by two Italian mycologists: people in a courtyard heard a noise like an exploding firecracker coming from a portico that faced the court; the concrete floor of the portico then split and slowly rose to reveal several compact mushrooms under the crack.

If for some reason all the fungi (and closely related bacteria) in the world were to cease functioning, much of the land surface would soon be buried in plant and animal remains (left). Mushrooms that live on dead or decaying plant material can decompose pine needles, broad leaves, dead limbs and logs. Parasitic fungi, on the other hand, attack living plants. Some

The toxins in this cluster of *Amanita muscaria* (known as fly agaric) have few effective antidotes.

Poison in destroying angel (*Amanita virosa*) kills. No antidote is known.

are highly destructive of forests; they can rot a tree's interior and cause millions of dollars of damage to commercial timber each year. The honey mushroom, a popular edible fungus, attacks and kills the roots: you can sometimes see lines of it paralleling the roots of a tree under siege. The tenacity of parasitic fungi is impressive. I once saw a honey mushroom perform a delicate balancing act on a tree root projecting from a roadside ditch across the street from my house. The root, exposed by erosion, was only about half an inch thick and so close to the road that passing traffic made it bob up and down. Yet the parasite clung, despite this precarious position, draining the tree of its life.

But a large group of mushrooms are beneficial to living trees. They take food from the partner tree while the tree gets food with their help. Sheaths of fine threads—the mycelium—linked to surface mushrooms either surround or penetrate the tree's slender rootlets in an interrelationship called mycorrhiza, meaning fungus root. A huge network of mycorrhizae around a root system acts like a fisherman's net: a larger net enables him to increase his catch; a large micorrhizal network enables a tree to draw more nutrients into its roots and to grow even in very poor soil.

While the study of mushroom morphology dates to the 17th century, the science of mushroom toxicology is very young. More has been learned in the past 20 years than in the entire history of research—and many myths about so-called easy ways to determine the edibility of mushrooms have been dispelled. It is not true, for instance, that a silver coin will darken when placed in hot water containing a poisonous mushroom but stay silvery if the species is edible. A coin will stay bright even in cooking water that contains destroying angels (above)—amanitas so deadly that only a few spoonfuls can kill. Nor is it true that a mushroom is safe to eat because the skin can be peeled off easily.

Just because a mushroom is eaten by animals (p. 100) does not mean it is all right for humans. Seeing an apparently "nibbled" mushroom, you cannot know if the pieces were actually eaten or if the animal survived, or if the animal is affected in the same way that we are by certain toxins.

The truth is that no rules exist for determining the edibility of *all* kinds of mushrooms.

Sophisticated instrumentation and laboratory techniques have enabled researchers to identify the toxins that have plagued, in sometimes bizarre ways, indiscriminate mushroom collectors. The deadliest, the amatoxins, were first found in amanitas—aptly called destroying angels and death caps—but are now known to exist in several mushrooms outside the amanita genus. Amatoxins are ten times deadlier than cyanide and probably cause 90 percent of all mushroom deaths in the United States and Europe. They destroy the liver and kidney cells. The most tragic single incident occurred near Poznan, Poland, in 1918, when 31 children died after eating a dish of amanitas at school.

The mystery of why some people became ill or died, while others were unaffected, after eating mushrooms

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called false morels, has been solved only recently. The toxin in false morels—gyromitrin—was linked to the toxin monomethylhydrazine (MMH) used as a fuel propellant in the Apollo space program where it caused illness (by attacking the nervous system) among technicians who handled fuel. Air Force scientists found a very narrow limit within which MMH either produced no effect or caused sickness and death in laboratory animals. With the mushrooms, gyromitrin, which breaks down into MMH, had reached a toxic or lethal level in some people—those who had consumed a greater quantity—but not in the others. Many false morel eaters have probably come closer than they know to a bad reaction.

Mushrooms known as inky caps can cause trouble, too. For susceptible people, the familiar phrase "If you drive, don't drink" should be modified to "If you eat inky caps, don't drink." This holds true for other mushrooms as well. Certain people have found, to their dismay, that when they consume alcohol a few hours after eating these varieties, frightening symptoms occur. Within ten to 30 minutes the face and neck may flush, the heart begins to beat rapidly, a metallic taste is noticed, hands feel as if they are swelling, arms and legs tingle and the head feels light. Nausea and vomiting usually follow. The culprit? A compound called coprine, which was discovered in 1975.

There are even hallucinogenic mushrooms. Within 30 to 60 minutes after eating them, a person may feel either happy or apprehensive. Sharp outlines of objects, brilliant colors and changing scenes are visualized when the eyes are closed. During the second hour, colors intensify, often forming patterns—bursts of fireworks—which are sometimes superimposed on dream-like shapes that rapidly appear and disappear. After another hour the visions gradually vanish; nausea and vomiting may occur, and even paralysis. These mushrooms have caused convulsions and death in children.

But every once in a while, even a mushroom is blamed for something it did not do. In 1975, a woman in New England became ill after eating some edible mushrooms she had gathered along a roadside. Her symptoms were those of lead poisoning. The toxins, it turned out, had been deposited on the mushroom caps by exhaust fumes from passing cars that burned leaded gasoline. A neurologist warned her against collecting mushrooms along busy highways.

My father has been conducting his mushroom forays in the woods of Uxbridge, Massachusetts, since the 1930s. Years ago he would often meet Jimmy, an Italian-born American, who lived in a nearby village. Jimmy searched for certain kinds of mushrooms, my father for entirely different types. Whenever Jimmy saw what my father had in his brown bag, he would exclaim: "You eat those? You'd never catch me eating those things." My father expressed equal horror at Jimmy's choices. The two men, bag or basket in hand, then continued on their separate ways. Two cultures, one Slavic, the other Roman, had met in the woods of a new country and did not mingle.

One day my father invited Jimmy to our house to sample "our" mushrooms. After some hesitation, Jimmy agreed. When he ate them—splendidly prepared by my mother—Jimmy's face creased with delight. He said from then on he would pick only "Polish" mushrooms. *I never did ask my father if he tried one of Jimmy's.*

Granddaddy puffball *(Calvatia booniana)* measures some two feet, makes small fry look even smaller.

Radiance of *Coprinus cinereus* belies common name: dung heap ink cap. Found on rotted grass, manure.

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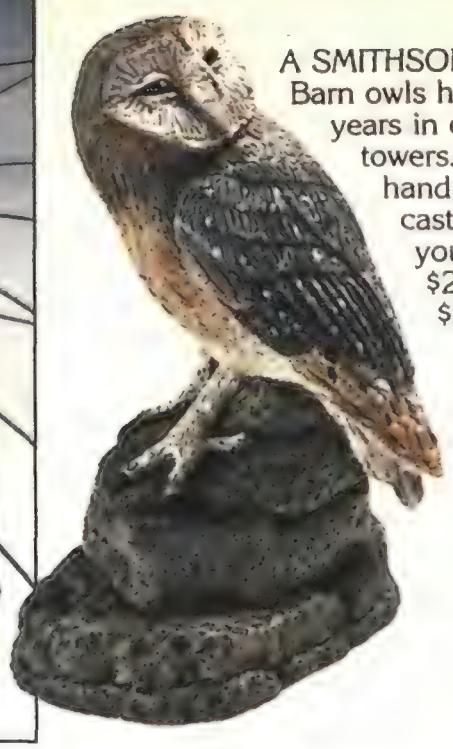

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National Collection of Fine Arts

Frederick MacMonnies' *Bacchante and Infant Faun*, 1894, is an individualized version of mythology.

By Jourdan Houston

Extravagant art that embellished our Gilded Age

To house children and servants, a château's the thing. So the growing family, fond of French Renaissance architecture, settled on a Château-de-Blois style in brick and limestone, for a site at Fifth Avenue and 57th Street. Allegiance to the Loire Valley, however, proved largely confined to the wedding-cake exterior, for their octagonal smoking room was Moorish, their watercolor gallery was Italian, and other decorations deferred to the tastes of the later Kings Louis of France. From turret to tapestry, in other words, the new house on the block was uniquely American.

So was its owner, a Sunday school teacher and businessman of means—"simple and inconspicuous," in the words of Augustus Saint-Gaudens. The sculptor was one of many to embellish this mansion in which simplicity would be conspicuously absent. Many months later the "simple" businessman—railroad magnate Cornelius Vanderbilt II—moved his household into its new quarters just south of Central Park.

By 1930, his château and many of the buildings along New York's "millionaires' row" had been demolished. And so had the notion, widely held as the century turned, that the Gilded Age had spawned a cultural sensitivity and artistic energy unmatched since the Renaissance. This American awakening had two stages: before 1893, eclectic; after that, a more coherent classicism.

The varied art and style of the period, which endured through World War I, was—later critics concurred—often imitative, at worst, tacky. An exhibition titled "The American Renaissance, 1876-1917," at San Francisco's M. H. de Young Museum May 31-August 10, invites a new and different appraisal of the epoch. The review will then travel to the Denver Art Museum, where it runs September 24-November 30.

Three years in the making, the American Renaissance show was first seen last fall at the Brooklyn

Sponsored by wealthy 19th-century magnates, American artists created a Renaissance that is now displayed in a sumptuous exhibit

Museum which, fittingly, was designed in 1893 by the era's most prestigious architectural firm—McKim, Mead and White (pp. 116-17). After Brooklyn, the show was at the Smithsonian's National Collection of Fine Arts until April 20. Its more than 300 works range from an ornate 1880 wallpaper fragment to a model of the seated Lincoln, sculpted by Daniel Chester French for the memorial in Washington, D.C. But why the revival of interest in such gewgaws? The period, however academic and eclectic, shows the hand of the artists at work and their love of the well-made and visually beautiful.

It all started in 1876, when European art came to Philadelphia for the Centennial Exposition. Ten million Americans—almost one-fourth of the population —gained the chance to be redeemed from lives of "ugly severity," said a political scientist named Woodrow Wilson. It was, he added, the "dawn of an artistic renaissance." Americans had discovered European culture and their own history.

The initial exuberant translation was encouraged by a new profession called "internal decoration." A New York home, praised in 1882 as "conspicuously artistic," embraced in close proximity both early Saxon and 15th-century Renaissance ceilings, a frieze after the Bayeux tapestry and windows of stained glass, all opening on an "Egyptian retreat" where lotus decor flirted with a hawk-headed god. The Vanderbilt house was not alone in its eclectic ostentation.

Externally, the early enthusiasm sometimes produced such haphazard results that one savant marveled over buildings with "Queen Anne fronts" and "Mary Anne behinds." So a $3-million New York palazzo for W. H. Vanderbilt emerged as an example of "Greek Renaissance," possibly, snorted contemporary critic Montgomery Schuyler, "because its architectural details are all Roman."

Museum of Fine Arts, Boston

Infant Bacchus tableau was meticulously realized in this stained-glass window by John La Farge.

The 1876 fair awakened Americans to culture and history just when the Robber Barons had made their fortunes and were ready to spend—conspicuously. Architect Richard Morris Hunt, for one, delighted this new elite with a Genoese villa here, a Corinthian bunker there. The fruits of his experience as the first American architect to study at the Ecole des Beaux-Arts in Paris dazzle—or overwhelm—his designs for "cottages" such as The Breakers in the wealthy resort of Newport, Rhode Island (pp. 114-15).

The new Medici made millions in a period of dramatic transition and cutthroat competition. Industry began consuming resources with such abandon that Rudyard Kipling tartly commented that most Americans' "good luck lives in their woods and mines and rivers and not in their brains."

Spending was equally profligate. Art patronage provided a mantle of respectability for parvenus. Gilt and marquetry masked the soot and sweat behind their money.

A penchant for the antique or foreign did not leave the native artist unemployed. Nor were the artists who embellished the palaces of the American Medici mere apologists. Rather, they believed in the times, in progress and in their mission in America. Most were trained in Paris and Munich, straying from once-popular Italy. The Ecole des Beaux-Arts and the ateliers of Paris became their loci.

One of this group, Augustus Saint-Gaudens, was 29 in 1877 when he returned from Europe as an accomplished sculptor. Miffed when the conservative National Academy of Design rejected his submission to its spring exhibition, he founded the mildly rebel-

Jourdan Houston now lives in New Hampshire, second home to Augustus Saint-Gaudens and many other artists of the American Renaissance.

Cooper-Hewitt Museum, New York

Frederick Law Olmsted jr. and Arnold W. Brunner created design for Inspiration Point in New York City.

The Brooklyn Museum

American Institute of Architects Foundation

Section of a building designed by Richard Morris Hunt for Chicago's 1893 Columbian Exhibition.

Workmanship on a finely decorated sideboard of ebonized cherry, circa 1875, has become synonymous with the firm of Herter Brothers, New York City. Design was based on English art furniture movement.

lious Society of American Artists. Its members became known as the "younger men," even as they aged, and formed the core of the fairly fixed constellation of American Renaissance artists.

These painters and sculptors were unapologetic about their European training, with its stress on drawing and on the modulation of colors in art. And the training did leave its mark. "When to-day we look for 'American art' we find it mainly in Paris," Henry James noted in 1887. "When we find it out of Paris, we at least find a great deal of Paris in it."

But Saint-Gaudens, and most of his colleagues, used foreign mythology, symbols and techniques to glorify the American way. From his first major work of a seated *Hiawatha*, started in Rome in 1870, to the double-eagle coins he designed for the U.S. Mint just before his death in 1907, Saint-Gaudens filtered his European-gained skills through the American experience. As in his *Ceres*, goddess of agriculture, which vanished when the Cornelius Vanderbilt château was razed and did not surface until 1978, classical myths were used to symbolize American bounty (p. 112).

Saint-Gaudens and his allies were "determined to do something as Americans for art in America," declared contemporary critic Clarence Cook. They readily conveyed their foreign-gained skills to students in the American art schools that flourished under their care. William Merritt Chase, just back from absorbing the darker tones of the Munich school of painters, began his influential teaching career at the new Art Students League in 1878.

Chase's New York studio was a gathering place for artists and their friends. One guest remembered him as "a real Bohemian, with his soft tie, his narrow French silk hat, looking (as he, of course, wanted to look) as if he had just escaped from the Latin Quarter."

Artists' attire aside, American sculpture began to wear American clothes. No longer was George Washington draped in neo-Greek folds as in Horatio Greenough's depiction, pointing, as the contemporary canard had it, to where he left his trousers.

Not only were American heroes shown as Americans, but they were depicted more frequently, invading village green and city square. An early example was Daniel Chester French's *Minute Man*, unveiled at Old North Bridge in 1875, the first important commission for the 25-year-old sculptor. French had been given his first sculpting tools by neighbor May Alcott,

The Metropolitan Museum of Art

Composed of polychrome marble and applewood, *La Jeunesse* was sculpted by Herbert Adams about 1910.

Elihu Vedder's study for *The Art Idea* became a mural at Bowdoin College in Brunswick, Maine.

Saint-Gaudens National Historic Site, Cornish, New Hampshire

Superb, long-missing panel, *Ceres,* done in 1882 by Augustus Saint-Gaudens, was relocated in 1978.

sister of Louisa, and had little formal training. His bronze patriot, its stance borrowed from the *Apollo Belvedere,* was otherwise a very American product. At the wintry April dedication, President Ulysses S. Grant joined Emerson, Lowell and Longfellow in a ceremony so long that wags said more people died of chill than perished in the memorialized battle.

All the heroes weren't men. Beyond technical competence and a classical drift, the artists did not share a common style or subject. But if any motif emerges in the American Renaissance, it is the cult of the American woman, expressed from tapestry to the newly popular tile. It permeates the art of the portly Thomas Dewing, "who painted gossamer ladies in gowns and shadows of mother-of-pearl," as Mary French, the sculptor's wife, observed. It stares out frankly from Herbert Adams' *Jeunesse* (above) and languishes in John La Farge's stained-glass nymph as she lends an easy shoulder to the infant Bacchus (p. 109). "If there is anything the Americans pride themselves on—and justly—it is their handsome treatment of women," observed Scotsman James Fullarton Muirhead, sent to write the first Baedeker guide to the United States in time for the 1893 Chicago exposition.

The Brooklyn Museum

The woman represented by these artists was supple and innocent, not idealized but distant, a Gibson girl who never let Greek drapes or classical profile mask her American origins.

But the discovery—or rediscovery—of the age was the excitement of artistic collaboration and the recognition of the artist as an American Renaissance man. Louis Comfort Tiffany in 1879 founded Associated Artists, a collaborative effort devoted to providing the loftiest in interior decoration for the American Medici. Son of jeweler Charles Lewis Tiffany, he first studied painting and remained especially partial to watercolors (then considered less serious than oils). When only 27, he was drawn to experiment with glassmaking. The distinctive results he perfected bore the name "favrile," from the Latin *faber*, or craftsperson.

John La Farge was another of the age's multifaceted talents (some would say quintessential eclectics). He gave up reading law to help revive the mural, popularize Oriental motifs and, like Louis Tiffany, revolutionize stained-glass techniques. La Farge's curiosity about the opal glass in his toilet articles inspired him to develop the colorful "opalescent" glass for use in his windows.

La Farge also provided inspiration (and jobs) for many of his colleagues. He employed Saint-Gaudens as a painter in Henry Hobson Richardson's Trinity Church and as a sculptor in the Cornelius Vanderbilt house (La Farge designed the *Ceres* panel). Saint-Gaudens admitted that "No doubt . . . my intimacy with La Farge has been a spur to higher endeavor."

But the real glue in various collaborative efforts were the architects, equally at home in the clubs of the elite and the ateliers of the artists. And at the apex of the age's architectural firms was McKim, Mead and White.

Rejecting the admonition of Gothic enthusiast John Ruskin that the Renaissance style was "an architecture invented . . . to make plagiarists of its architects," the trio set the stylistic pace for the period in which their classically inclined architecture led (some would say misled) artistic taste. Quaker-bred Charles Follen McKim, inspired by his training at the Ecole des Beaux-Arts, helped revive the Greco-Roman tradition in his adaptations. The flamboyant Stanford White, drawn to painting by nature and to architecture by practicalities, mixed his Italianate leanings with whimsy. William Rutherford Mead, a Vermonter, lent Yankee pragmatism to the engineering strengths of the firm. From their "bonds of true fellowship," as Mead later put it, emerged such landmarks as the Boston Public Library and the original, since demolished, Madison Square Garden.

To ornament their buildings, they demanded the best. The Boston Public Library, designed by McKim, employed such famous sculptors as French, who executed the bronze doors, and Saint-Gaudens. Frederick MacMonnies, a former Saint-Gaudens apprentice,

"Palatial" begins to describe ornate dining room at The Breakers "cottage" in Newport, Rhode Island, designed for Cornelius Vanderbilt II in the gay, glittering 1890s. Architect was Richard Morris Hunt.

American Institute of Architects Foundation

This Hunt design was accepted for The Breakers; another story was added when the mansion was built.

sculpted an airy—and nude—Bacchante, which scandalized Bostonians (p. 108). McKim had given the work to the citizenry, who had decried the library as "a morgue on the Back Bay," but it lingered only briefly after three women fainted at its unveiling.

Coherent planning, camaraderie and the dominance of the classical came together in 1893 at the "White City"—the World's Columbian Exposition in Chicago. "All the artists were there," recalled Mary French, "most with their wives. It was quite an exciting life for anyone who cared about art—the men working all day . . . talking art in the evening."

Hyperbole was at home on the 613 acres of reclaimed bog. "Chicago ought never to be mentioned as Porkopolis without a simultaneous reference to the fact that it was also the creator of the White City, with its Court of Honour, perhaps the most flawless and fairy-like . . . of man's invention," exclaimed author James Muirhead.

The $26 million paean to American prowess engaged ten eminent architects to produce the city of American aspirations. Frederick Law Olmsted sr., cajoling nature in his last major public design, landscaped terrain so wet that the huge lagoon amid the classical structures would have been there, planned or not.

The designer of Central Park, Olmsted had come to landscape architecture by way of journalism and experimental farming. He had submitted his design for the 1858 Central Park competition when he was 36, thus launching himself on a career to show the "manifestly civilizing effect" of parks—a theme well in tune with American Renaissance ideals and with the Columbian exhibition.

Most importantly, the fair helped wean American taste from the eclecticism of the 1870s and 1880s, plumping the classical mode at the expense of gimcracks and gingerbread. Less and less could one say, as novelist Edith Wharton and decorator Ogden Codman jr. did in their influential 1897 book, *The Decoration of Houses,* that American decoration could be "compared to a person who is called upon to write a letter in the English language, but is ordered . . . to conform to the Chinese or Egyptian rules of grammar, or possibly to both together."

Classical standards spread rapidly westward. By 1898, one critic of San Francisco's Nob Hill complained that "misdirected" architects had used local timber construction "to slavishly imitate the incongruous features of stone houses in the style of the Renaissance." But San Francisco and many other cities, most notably the then shabby Washington, D.C., would benefit from the City Beautiful movement inspired by the White City in Chicago.

The dominant architectural legacy of the fair emerged in public buildings, punctuated by the appropriately classical pedestal or allegorical mural. These were the years of Theodore Roosevelt and his "big stick." Fervid nationalism demanded the trophies and temples fitting for an emerging world power. The nation assembled its art, a symbol of its cultural pretensions, in some 20 notable museums before 1900.

Patrons endowed the country's premier public libraries, where decoration and lofty ideals were not stinted. The Library of Congress, opened in 1897, contained more than 100 murals. Painter Kenyon Cox, whose depiction of the arts and sciences decorates the library, declared that the classic spirit required "not that [a work of art] shall be novel and effective, but that it shall be fine and noble." Cox stressed that emotion and individuality must defer to tradition, lengthening "the chain" rather than breaking it.

An Age of Excess

But if the six-month diversion in Chicago crystallized the Renaissance commitment of the day, it epitomized, to some, the less noble features of what has been called the Age of Excess. The White City was an illusion. It rose opulently in the midst of an economic depression. It could not dilute the labor unrest it helped to create by luring thousands of workers to mold its Corinthian columns, men whose agitation in the 1894 boycott against the Pullman Palace Car Company brought federal troops to the city to quell riots. Its buildings and statues, built from 30,000 tons of gypsum powder able to mimic any stone surface, would rapidly disintegrate.

Even the artists had mixed emotions. "It was very beautiful," Mary French recalled, "but I am afraid it seemed to us rather cold. The men loved to build it, but they spent most of their time [after the fair opened] in the Midway."

To their friend, Henry Adams, the result resembled

"a product of the Beaux Arts artistically induced to pass the summer on the shore of Lake Michigan . . . to impose classical standards on plastic Chicago." The artists, he thought, talked "as though art, to the Western people, was a stage decoration."

Was it? Art as veneer—purchased by the pound—that perception of the American Renaissance lingers. A disappointed William Morris Hunt, who would be stung by the erosion of his 1878 murals on the damp walls of the new state capitol in Albany, said before his possible suicide, "I might have painted if I had lived in an atmosphere of art, but in America everything resolves itself into the getting of money."

Much later, a bitter Louis Sullivan, Chicago architect of commercial buildings and mentor of Frank Lloyd Wright, condemned the "virus" of the fair, the source of a "violent outbreak of the Classic and the Renaissance in the East, which slowly spread westward. . . . Thus Architecture died in the land of the free. . . ." Wright, in his turn, called the American Renaissance "downright dementia."

Wright was experimenting with his organic architecture even as the Chicago fair began. In New York in 1905, Alfred Stieglitz opened the Photo-Secession gallery, introducing Cézanne and Toulouse-Lautrec to the United States and giving Pablo Picasso his first one-man American show (SMITHSONIAN, March 1980). Robert Henri would encourage John Sloan, William Glackens and other Philadelphia newspaper illustrators; their paintings in a 1908 exhibition shocked New York, and they later earned the label "Ashcan School" because of their portrayal of daily urban life. "Is it fine art to exhibit our sores?" one offended critic pouted.

By 1906, the once-rebellious Society of American

For the Brooklyn Museum, McKim, Mead and White designed an imposing neoclassical building, shown

Artists would be absorbed into the National Academy of Design. A new (if short-lived) Association of American Painters and Sculptors, piqued at the Academy, would organize the now-legendary New York Armory Show of 1913 where new visions of artistic expression, best remembered in Marcel Duchamp's *Nude Descending a Staircase,* scored American sensitivities.

Poor Kenyon Cox. He scolded the Impressionists for being formula-bound and the Cubists for resembling "a bad boy [drawing] on the walls of an outhouse," and he declared art's survival in doubt. The "chain" connecting the present to the past seemed weakened. But what of the energy that had forged it?

It can be argued that the momentum of the American Renaissance fostered later, antithetical movements. The Englishman James Bryce worried in *The American Commonwealth* if the young nation was capable of producing talent more pertinent to its own cultural fabric. He saw American artists of this period as "men who instruct and delight their own generation, though possibly future generations may not hold all of them in remembrance."

Their delight, if suspect for its profligacy, courses through their art. The instruction they provided, often disparaged as impersonal and academic, trained a generation of artists even if it was later dismissed by them. The American Renaissance endured well into this century in such works as Henry Bacon's Lincoln Memorial, finished in 1922, and so did many of the aging "younger men" whose names rarely evoke recognition today. John La Farge, the movement's quintessential chameleon, perhaps saw Bryce's point. "The fuel is consumed," he told some students in 1893, "but the fire may be transmitted."

here in an architectural rendering by Francis Hoppin. Unhappily, only part of it was ever built.

The Brooklyn Museum

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A couple of Southern towns almost started
a new Civil War over General Dan Morgan's body.

By James V. Murfin

Our old patriots' remains don't get to rest in peace

A national preoccupation with their bones makes it impossible for our Revolutionary War heroes to stay for very long in the same grave

Twenty-eight years ago on an August Sunday morning, a long black hearse pulled up to the iron gate of Mt. Hebron cemetery in Winchester, Virginia. A passenger got out and asked for superintendent Oscar Harry.

"I'm undertaker J. G. Floyd from South Carolina," he said. "I've brought two grave diggers with me. We're here to remove a body."

"Just who is it you want to remove, Mr. Floyd?"

"Man by the name of Morgan," Floyd replied.

"Morgan? Rather a common name. What Morgan would that be, Mr. Floyd?"

Floyd took a sheaf of papers from a briefcase and handed them to Harry. The superintendent read the first line and exploded.

"General Morgan, sir? You're not taking General Morgan, today, tomorrow, or the next day!" And with that Oscar Harry stomped off to his telephone to warn fellow townsmen that a dastardly attempt was being launched to snatch Dan Morgan's bones. Floyd got into his hearse and drove to the nearest pay phone to get reinforcements from the Cowpens Committee in Charge of Getting General Morgan's Body.

Illustrations by W. B. Park

Restless Revolutionary bones

Monday morning Winchester's daily newspaper questioned whether the Solid South was divided: "One old soldier who did die has failed to fade away. . . . Gen. Daniel Morgan, hero of the American Revolution, isn't alive. Hasn't been, in fact, for some 149 years. But a couple of southern towns are about to start another Civil War over his body."

If the spirits of Nathaniel Greene, John Paul Jones and other old Revolutionary War veterans were watching at that moment, Morgan likely nudged them and said, "Move over boys, it's my turn now." Dan Morgan was the latest in a long line of old soldiers of 1776 to have his bones rattled. For myriad reasons—bringing them home, placing a new monument, finding a more "suitable" grave, disputes over who owned whom—some of our Founding Fathers had little rest after death.

In the late 1820s a disgruntled employee of Bushrod Washington, who owned Mount Vernon following Martha Washington's death, broke open a coffin in the family cemetery and stole what he thought was George's skull. Then he went to town where he got drunk and bragged about his acquisition. When he was later arrested, it was discovered he didn't have George at all, thank God, but rather an obscure relative. After that a new tomb was built and GW and Martha were securely sealed away forever.

The first of the Revolution's heroes to fall victim to a long succession of reburials was Major General Joseph Warren, the first American general to die in the war. Warren, successful physician and Massachusetts political activist, was appointed, but not yet commissioned, a major general of the militia just days before he walked onto the battlefield at Bunker Hill, June 17, 1775. Almost immediately the new general was killed.

Warren had no uniform; he had gone into battle wearing a light-colored coat, white-fringed waistcoat and powdered wig. Rumor had it that while the general's body was being placed in a hastily dug grave, the fancy clothes were hawked for sale by a British soldier. He was taken up shortly after to be viewed by British officers who considered his death something of a victory over the rebels. Again he was buried on the battlefield, and there he remained for the next ten months until the British evacuated Boston.

Then came time for a "proper" funeral, but first General Warren had to be found and identified. His family had been told he was buried beside a man wearing a "farmer's frock." It was Warren's close friend Paul Revere who made positive identificaton. A few weeks before the general's death, Revere, sometime dentist, had made two artificial teeth for Warren and had attached them with a silver wire. Revere never forgot that day when he was called to a grave to identify the skull of his old friend.

Warren's funeral was Masonic and military and probably the largest Boston had seen in years. The general was buried, now for the third time, in the Old Granary Burying Ground. Then, 48 years later, he was moved to the vaults under Saint Paul's Church. And in 1855 he was moved once more to Forest Hills Cemetery. Each time he was identified by the false teeth and Revere's silver wire. For years rumor had it that Warren's skull was owned by the Old South Association, proprietors of Old South Meetinghouse, in Boston. No one at the Association knows about it today. But a photograph of the skull taken in 1855 clearly shows Revere's handiwork.

General Warren, much moved, was carefully identified by Paul Revere's silver-wire dentistry.

Washington free-lancer James V. Murfin is presently writing a Revolutionary War novel.

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Ethan Allen, a rough-and-ready soldier who seemed to be the constant subject of controversy during the war, was no less the cause of dispute in death. His bones have been lost for more than a century.

"The angels are waiting for you, General Allen," his minister supposedly told him as he lay dying. Some say the general rose up in bed and shouted, "They are, are they? Well, Goddam 'em, let 'em wait." A myth, but, the story characterizes Allen, who died in 1789 and was buried in Burlington, Vermont. His family provided a plain marble slab inscribed: "The corporeal part of General Ethan Allen rests beneath this stone, the 12th day of Feb., 1789, aged 50 years. His spirit tried the mercies of his God, in whom alone he believed and strongly trusted." This marker was still in place and the inscription legible as late as 1849 when Benson Lossing copied it for his *Pictorial Field Book of the Revolution*. During the next decade, however, the elements, vandals and souvenir hunters completely destroyed all signs of the grave.

Then came time for the inevitable guilt. In 1855 the Vermont legislature voted $2,000 to honor the state's most important and neglected hero. A new monument, 42 feet high, granite, topped with an eight-foot statue of the general, waited while authorities searched for a place to put it. No one could remember where Allen was buried.

Did the jolly medical students get him?

A persistent rumor arose, known as "Ethan Allen's Bones and the Jolly Medical Students." It concerned three young men who supposedly dug up the body for a dissecting experiment. Dismayed, but undaunted, the monument committee found two elderly gentlemen who claimed they had attended the funeral some 66 years earlier, and they, to the best of their memory, pointed to the right spot. The giant shaft went up and on it an inscription which read that Allen was "buried near the site of this monument."

There's no question at all where Mad Anthony Wayne is buried. He lies in two separate and distinct graves. After the Revolution Anthony Wayne, famed for his assault on Stony Point in 1779, was asked by Secretary of War Henry Knox to command a small force against rebellious Indians in Ohio. Wayne was successful, but on his way home his luck ran out. He was stricken with gout, took refuge in a frontier blockhouse at the edge of Lake Erie and died before his friend and surgeon, Dr. J. C. Wallace, arrived.

Anticipating death (he was 51), the general requested that he be buried at the blockhouse. His wish was granted and the little fort became his memorial. In 1809, Colonel Isaac Wayne, the general's son, decided to move his father closer to home. Children always seem to know what their parents "would have wanted." Thinking he would return with, at best, little more than a box of bones, Colonel Wayne drove a small, one-horse carriage. Along the way he was joined by old Dr. Wallace, who would help identify the remains. Much to everyone's surprise, when the general was dug up he proved to be as stubborn in death as he was in life. His body was almost perfectly preserved. God knows, he was ripe for another funeral. And he got it. Two of them.

Ethan Allen, near death, supposedly rose to bellow that the angels would have to wait until he was ready.

There was no way the colonel's carriage could accommodate a large coffin, so Dr. Wallace, being a surgeon, went to work. Using boiling water and knives, he removed the leathery skin from the skeleton, reburied the skin in the original grave and sent the colonel off with his box of bones. Anthony Wayne—his bones that is—was buried a few days later in St. David's courtyard, at Radnor, Pennsylvania, near the home he had left many years before. Dr. Wallace's two knives are displayed today in the blockhouse; the boiling pot is in the Erie Public Museum.

As time passed, the blockhouse was abandoned and burned and Wayne's first grave was lost. Many years later, with the help of a Dr. Edward M. Germer, a physician and Wayne devotee, the original coffin was located and the grave identified and marked. Today a reconstructed fort stands over the first grave and serves as a memorial on the grounds of the Soldiers and Sailors Home in Erie; in Radnor Wayne's bones rest in peace beneath a granite obelisk. In recent years the general's personal possessions have been sold at auction. His past has been scattered. Presumably *he* will remain so.

Nathanael Greene, a Rhode Island general who

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Restless Revolutionary bones

emerged from the war second only to George Washington in military reputation, died in 1786 at Mulberry Grove, a Savannah plantation given to him at the close of the war. The vault in which Greene's remains were placed, like Mulberry Grove itself, originally belonged to John Graham, whose estate had been confiscated because of his Tory sympathies. Graham's name, etched on the marble tomb, was never removed and Greene's name was never added. Sadly, Mrs. Greene moved away and remarried and the people of Savannah forgot the man who had chased the British out of the South toward Yorktown and defeat.

Then came time to erect a 50-foot marble obelisk, designed by the town fathers and an architect, to rest over Greene's tomb. The Marquis de Lafayette, on a triumphant return visit to the United States in 1825, laid the cornerstone. The memorial was completed in 1830 and bronze plates depicting Greene in action added in 1885, all without the general to go with it. No one could remember where he had been put.

Finally, in 1901, someone thought of John Graham, Mulberry Grove, and the Graham vault in Colonial Park. Sure enough, there was Greene, identified by the casket plate, remnants of his uniform and by the remains of his young son who had been buried with him. On November 14, 1902, in the inevitable "impressive ceremony," Nathanael Greene was at last laid to rest beside his now 72-year-old monument.

Some 60 years later Savannah went through the throes of another wild search for a missing body: that of Button Gwinnett, one of the most colorful signers of the Declaration of Independence. Seeking a more active role in the war than that of delegate to Congress and speaker of the state assembly, he coveted command of Georgia's troops. When the job went to General Lachlan McIntosh, the hotheaded Gwinnett promised revenge.

In February 1777 Gwinnett was appointed governor and commander of the militia. He immediately had McIntosh's brother arrested for trading with the British, then seized the general himself on the basis of guilt by association. Gwinnett and McIntosh were called before the assembly to testify. The assembly approved Gwinnett's actions. The general, furious, called Gwinnett a "scoundrel and a lying rascal." Gwinnett replied with a challenge to a duel.

Next morning along Sea Island Road near Savannah the two faced off at four steps. Both took bullets in the leg, but Gwinnett's wound became gangrenous and three days later he died.

For the next 183 years, no one really cared where Gwinnett was buried. Some said Saint Catherine's Island, others said the village of Sunbury; the records were silent. Then Arthur J. Funk, a retired Savannah school principal, proclaimed that Gwinnett was buried in Colonial Park and set off a dispute that extended to the Smithsonian Institution and back.

The inscription on the stone Funk found was nearly obliterated, but he was able to distinguish a G, a T, and a 7, enough to indicate the name and date of death, he said. Further, when the bones were exhumed Funk found that the left femur was damaged. He concluded that this was caused by the bullet from McIntosh's gun. Immediately a Savannah physician and authority on Indian archaeology called Funk's evidence "flimsy" and offered to have an expert take a look at the leg bone. Smithsonian archaeologist Marshall T. Newman concluded that the damage was not caused by a bullet and that the bone was from a short person, perhaps even from a woman. Gwinnett was said to have been six-feet tall.

Button Gwinnett lies somewhere around here

Funk took his case to the Savannah Historical Site and Monument Commission, which ruled in his favor. Gwinnett's supposed bones were reburied at Colonial Park Cemetery beneath a monument which now bears the inscription: "Button Gwinnett . . . born 1735, died 1777 . . . whose remains, buried in this cemetery, are believed to be entombed hereunder. . . ." They're still not sure.

The most recent Continental officer to jump from grave to grave was Major General William Moultrie, whose remains were moved in June 1978 from the family graveyard near Charleston to the grounds of the Sullivan's Island fort that he defended in 1776 and which bears his name. It cost taxpayers several thousand dollars, but if ever there was a lesson in politics and how the good old American system works, this is it.

In early 1975 the Reverend Edward B. Guerry, a direct descendant of Moultrie, found that the general's

Much to everyone's surprise, Mad Anthony Wayne proved to be as stubborn in death as in life.

Buried for 13 years, his body was almost perfectly preserved. God knows, he was ripe for another funeral.

grave at Windsor Hill Plantation, the original homesite, had been vandalized. Seeking help in retrieving the missing marker, Guerry turned to the National Park Service at Fort Moultrie. In his letter he made several proposals: find the gravestone and move it to the fort, establish a more fitting monument to Moultrie at the fort, or, finally, move the general there.

The Service replied that it would be happy to help in the search for the missing stone, but the other proposals were inconsistent with government policies of historic preservation, that is, the disturbing of historic Fort Moultrie. They were on pretty shaky ground here because the original site of the fort was, in all probability, worn away by the ocean, putting the reconstructed site on nonhistoric land. Be that as it may, Guerry called in Senator Strom Thurmond, Governor James Edwards, the Daughters of the American Revolution and other groups.

In answer, Secretary of the Interior Cecil Andrus ruled that the National Park Service would be happy to receive and properly bury General Moultrie. All they had to do was find the right grave.

On June 28, 1978, 202 years from the day of the Battle of Sullivan's Island, the Second Regiment, South Carolina Line, Continental Establishment, fired a 21-gun salute as General William Moultrie's ashes were lowered into the ground. The ashes barely filled a three-by-five-inch box.

Even less remains of British Brigadier General Simon Fraser, fatally wounded during the second battle of Saratoga, October 7, 1777. Fraser, "dressed in the full uniform of a field officer" and mounted on a "splendid iron-gray gelding," was a conspicuous target on the battlefield, and within minutes of his appearance fell.

In the late 1840s, when Benson Lossing toured Revolutionary War sites, he saw and sketched Fraser's battlefield grave. In the following years, however, that

area was stripped for molding sand used in foundries. Archaeological studies in the 1970s revealed soil discoloration where the grave was thought to be located, but not a single artifact or bone has ever turned up. Some speculate that General Fraser is likely scattered through hundreds of sewer pipes and manhole covers along the Hudson.

Daniel Boone is not really regarded as a figure of the American Revolution, but he was around and participated in the "last battle" at Blue Licks, Kentucky. Better known than most of his fellow explorers and frontiersmen, Boone has had good press and his grave is virtually a shrine, visited by literally thousands of tourists every year.

Boone died in Missouri in 1820 at the age of 85. He was buried near his wife, Rebecca, who had died five years earlier. According to a story on file in the Missouri Historical Society, the gravediggers first dug on both sides of Rebecca, finding an earlier grave on one and unsuitable soil on the other, so Daniel was buried at his wife's feet. To further confuse matters, 16 years later the family placed twin headstones over Rebecca.

Missouri's claim to Boone was tenuous at best. True, he had spent his last years and had died there, but it was Kentucky that claimed him as founding father, and in 1844 the Kentucky legislature decided it wanted him back. The "disinterment committee" obtained written permission from Daniel's descendants to move the remains and then petitioned the Missouri legislature for the state's consent.

In an apparent weak moment, consent was granted. Realizing its mistake almost immediately, Missouri set out to erect a $500 monument to mark the grave site. Too late. Before legal means could be found to block Kentucky's efforts, two officials arrived to claim the body. The St. Louis *New Era* reported the story, datelined July 17, 1845:

"At about 5 o'clock this evening a large concourse of ladies and gentlemen, consisting of family relations and neighbors, attended at the graves of Mr. and Mrs. Boone to witness the resurrection of their remains.

"On opening them, the large bones were found to be perfect in size and shape, but of a very dark color, and so far decomposed in substance as to have lost their strength and weight to a considerable extent; a number of the smaller bones were rotten, and could not be raised in form; the coffins were entirely rotten and gone, except the bottom plank, which remained in a very imperfect state."

Daniel and Rebecca were taken to Frankfort by boat where they waited reburial on September 13. The night before the ceremonies a plaster cast was made of Boone's skull. This is today one of the prize possessions of the Kentucky Historical Society.

Missouri first began attempts to reclaim Boone in 1935. Then 20 years later the Chamber of Commerce at St. Charles, Missouri, tried a new twist. "Return Rebecca," they said. "We still have Daniel." They

After burial in a lead coffin sloshing with alcohol, John Paul Jones was remarkably well preserved when he was dug up in 1905, 113 years after his death.

On July 6, 1905, a full 158 years after his birthday, a large military procession through Paris (left) started Commodore Jones on his way to the States.

cited a statement by Jefferson Calloway, a slave who had helped the removal of the bodies in 1845. Calloway claimed he had foxed the Kentuckians by not revealing that Daniel did not lie "beside" Rebecca, but rather at her feet. S. G. Griswold, who witnessed the disinterment, corroborated this when he said that Rebecca's coffin was in good condition as opposed to Daniel's, which had virtually disintegrated. It may well be that Kentucky was indeed hoaxed.

John Paul Jones was to the high seas what Daniel Boone was to the Kentucky wilderness—a legendary hero. He was a flamboyant captain whose career spanned two hemispheres and influenced many nations. His tomb beneath the chapel at the United States Naval Academy, Annapolis, Maryland, is the most splendid of all Revolutionary War officers', and rivals some of the most ornate in this country, including those of Presidents. To this day Jones is lionized at Annapolis as the father of the American Navy.

Jones died in 1792 in Paris, where he had been ill and in the care of friends. His friends apparently intended to have his body returned to America. Instead, he was buried in St. Louis Cemetery in northeast Paris, a government-owned plot for foreign Protestants. He was then forgotten for more than a century. In 1899, General Horace Porter, Ambassador to France, began looking for Jones. And found him six years later, exactly where he had been buried. But things had changed. St. Louis Cemetery had long since been abandoned and covered over by the expanding city. After having determined the location, Porter arranged with shop owners and residents for permission to dig. A complex network of shafts and tunnels was constructed, and, after two-and-a-half months of painstaking work, Jones' coffin was found.

The report on the process of identifying the body is one of the most macabre documents ever published by the Government Printing Office—210 pages plus illustrations. Jones was buried in a lead coffin filled with alcohol and straw; the body was "marvelously well preserved," as photographs accompanying the report to the Congress clearly demonstrate in gruesome detail.

An autopsy was conducted and careful comparisons were made with the Jones life bust sculpted by Jean Antoine Houdon. Identification was positive.

President Theodore Roosevelt ordered a squadron of war vessels to Cherbourg to bring home the body of America's hero. On July 6, 1905, 158 years after Jones' birth, 500 sailors marched in a solemn military procession to the American Church of the Holy Trinity in Paris for a brief and "impressive" service officially transferring Jones' remains from the French to the American government.

Jones was brought to Annapolis by the USS *Brooklyn,* suitably escorted, then promptly his body was shelved away in a vault until plans for another "elaborate ceremony" could be arranged. Jones waited while a tomb was built. And the midshipmen at the Academy, to the tune of a popular song called *Everybody Works But Father,* sang:

Everybody works but John Paul Jones!
He lies around all day,
Body pickled in alcohol
On a permanent jag, they say.
Middies stand around him
Doing honor to his bones;
Everybody works in "Crabtown"
But John Paul Jones!

In 1913, Jones was finally laid to rest in the specially designed sarcophagus. A conservative estimate for the total price of the Jones caper would be between one and two million dollars—in early 20th-century dollars. But Jones probably would have considered it long overdue and not nearly enough.

As for Dan Morgan, the battle between Winchester and Cowpens raged; a great-great-great grandson was found who wanted the general undisturbed—to counter the great-great-great granddaughter who had authorized the move. Politicians entered the fray, reaping valuable publicity. A historical society in New Jersey, deep in the North, offered to settle the new Civil War by reminding the irate Southerners that Morgan came from there, was, in fact, a damyankee and would be welcomed in "a fitting spot" beside the bones of their "own warriors." The voice from the North was not taken seriously. A judge found for Winchester. Morgan would remain there. Cowpens had to kick in $250 for court costs.

The old general would have been disappointed. For a paltry 250 bucks the war was over. But the Virginians came out of the affair with a case of guilt and immediately set about raising $2,000 for a new memorial. A Cowpens rebel approved: "We just wanted to see the old gentleman treated right, here or there."

Virginians finally won the right to keep Dan Morgan's bones, but then, feeling somewhat guilty, they raised $2,000 to erect a new memorial above them. The South Carolinians accepted the loss with grace.

MEETING THE DEMANDS OF SOCIETY IS NO EXCUSE FOR BUILDING A BORING CAR.

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All in all, in a time of lowered automotive expectations, amidst increasing mediocrity, the engineers at BMW have actually improved the BMW 528i.

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Packed snugly to reduce the chance of injury, an oryx waits patiently for the long flight to its old home.

Closely guarded in Jordanian wildlife reserve, these antelope are becoming accustomed to the land where

The Arabian oryx comes back to its native desert

No one has reported seeing one in the wild since 1972, but thanks to captive breeding this symbolic antelope now has a new chance

The Arabian oryx, a creamy white antelope as important to the Bedouin as the lion is to Africans, is returning to its desert homeland in the Middle East. Five of the rare animals—believed to be extinct in the wild—arrived in March, the third shipment in as many years from captive breeding groups in U.S. zoos.

For the Arab people, the oryx is a symbol of strength and beauty; its ability to survive in the desert is legendary. The Bedouin believe that someone who has been shot can expel the bullet by eating oryx meat.

Bedouin once considered killing an oryx a sign of manhood. The hunting was done on foot or from the back of a camel or horse, using a spear, a bow and arrow or possibly an old-fashioned rifle. Against these odds the oryx continued to exist. But by 1920 modern rifles and automobiles were becoming available, and the oryx population began to dwindle. In the late

their ancestors were driven to extinction. Bedouin leaders have pledged that the oryx will not be hunted.

1930s, large-scale oil production meant suddenly wealthy princes, an invasion of foreign workers—and more pressure on the oryx. As many as 300 cars took part in a single hunt; automatic weapons were used. By the late 1950s the oryx was nearly extinct.

In 1962 members of the Fauna Preservation Society of Great Britain, with help from the International Union for Conservation of Nature and Natural Resources (IUCN), mounted an expedition into the Arabian desert. Equipment broke down in the heat and the expedition leader, Major Ian Grimwood, broke several ribs. But the group captured three oryx: two males and a female. Those animals became the nucleus of what is now the World Herd.

With the help of the World Wildlife Fund, the Shikar-Safari Club and the IUCN, the three antelope were flown to the Phoenix Zoo. Saudi Arabia sent two males and two females, and Kuwait contributed a female, as did the London Zoo. The herd began to build.

In November 1972, six were shipped to the San Diego Wild Animal Park and reproduced so well that 54 have been born there. The time had come to reseed the desert.

Groups of Arabian oryx were flown from San Diego to the Shaumari Wildlife Reserve in Jordan in 1978 and 1979. Then, last March, three males and two females were flown to Oman. They will live in a fenced area until December, then be released into the wild.

The animals in Jordan are soon to be released into the 5,500 acres of the reserve and their prospects look good. Bedouin leaders have sent word that they will not allow the animals to be hunted. The oryx will—finally—be fully protected in its ancestral land.

—Bradley Smith

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Almadén makes it right.

Admiral Peary cut a fine figure in dress uniform years after securing meteorites.

Courtesy The American Museum of Natural History

The 34-ton meteorite *Ahnighito* is positioned over the hold of Peary's ship.

A four-year fight to bring home a giant meteorite

Before he aimed at the North Pole, Robert E. Peary spent four incredible summers wrestling Greenland iron

By Edward Peary Stafford

The big old house at Eagle Island, perched on a point of land jutting into Casco Bay, has a living room like the bridge of a ship. Windows on three sides look over the bay to other islands, back toward the coast of Maine, and out to the Atlantic Coast. A massive chimney divides the room, which is filled with Arctic trophies. On the mahogany mantelpiece are hawks and owls, fiercely natural. There are narwhal horns, walrus tusks, the heads of polar bear and musk-ox and eggs of Arctic birds in their nests.

But to a young boy summering in that house all his growing years, nothing had so much allure as a curious, trapezoidal chunk of iron. One side of it was smooth and shiny, silky to the touch, with peculiar geometric figures. The rest was dark gray, rough, irregular and pitted. Although it must have weighed two pounds, it fitted into the palm of my hand—for I was that boy. And the collector of artifacts had been my grandfather, Rear Admiral Robert E. Peary.

In Maine, even summer evenings are chill. Since it was before radio and television pervaded our homes, we would sit around the fire after dinner and listen to my grandmother's stories of how all the wonderful things came into that house. The tales I liked best had to do with my chunk of iron. To a child it was spooky, and bespoke its extraterrestrial origin. For it was a small piece of a large meteorite that had fallen on Greenland, perhaps 10,000 years ago.

Late in the last century my grandfather, then a young lieutenant in the Engineer Corps of the U.S. Navy, had led the expeditions which located, excavated and brought to the American Museum of Natural History in New York City "my" meteorite and two others, including the 34-ton *Ahnighito,* the largest ever put on display. When the new Arthur Ross Hall of Meteorites opens there in the spring of 1981, those three will be the centerpiece of its collection.

The meteorites were located on a rim of the polar desert surrounding Melville Bay, an indentation in the west coast of Greenland. There, during four brief Arctic summers, Lieutenant Peary had pitted all his determination, energy and wits against snow, ice and violent winds. Moreover, the task of securing the 34-ton meteorite proved so harrowing he came to feel as though he were up against the deliberate malevolence of a live, demonic adversary. It was a merciless testing of men and dogs and material. And the summers from 1894 to 1897 were followed by

Retired from a naval career as a destroyer commander, aviator and fleet historian, the author currently is a writer for NASA.

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Kobe	78	Toyonaka (Sanuki)	87562
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Kurashiki	864	Yokosuka	562

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winters when he or his wife argued, cajoled and gave lectures here at home to secure the funds and backing to enable him to continue. This account is based on his journals and other writings.

For centuries the Polar Eskimos of Greenland had waged a continuous, seesaw, touch-and-go struggle for survival, with life often hanging on an ivory spear thrust at a one-ton walrus, or, with only an ivory knife and a dog or two as allies, mortal combat with the great white bear.

One explanation of that survival came in 1818 when Captain John Ross of the Royal Navy, the first Caucasian to make contact with the Eskimos of Smith Sound, found their tools and weapons to be tipped with iron.

The Eskimos told Captain Ross, as nearly as he could determine through the barrier of language, that their precious flakes of metal came from an "Iron Mountain" on the northern shore of Melville Bay. (Subsequent analysis of the iron showed the presence of nickel, pointing to a meteoric origin.)

For the remainder of the century, at least half a dozen expeditions into that area had as one of their goals the discovery of the Iron Mountain of Melville Bay. But the Eskimos were superstitiously reluctant to give away their secret; the shifting bergs and floes of Melville Bay were deadly to wooden ships; and the time for searching was limited to a few short weeks each summer. So it was not until late May of 1894 that my grandfather, having earned the trust of the Smith Sound people, was led by one of their hunters to the secret site of their *Saviksue,* or Great Irons.

What he found was no mountain but three irregular lumps of iron, pocked and pitted from their fiery flight, and dark bronze with the rust of millennia.

Two of the masses, called by the Eskimos the Woman and the Dog, lay loosely among the granite rocks on the south slope of a small mountain bordering Saviksoah Bay, an arm of Melville Bay. The third, and much the largest, known as the Tent, was found almost completely buried, 80 feet above high water and only 100 yards from the eastern shore of an island six miles to the south.

Hundreds of smooth, bluish-green stones were heaped around the Woman, where generations of Eskimos had used them to chip their precious flakes from the stellar iron. None of the cobbles was freshly used, and the *Saviksue* showed no recent scars. Wrote Peary: "For several generations . . . no use had been made of the iron of these meteorites by the natives; they obtaining their scant supply of knives from the whalers and expedition ships visiting their coast or beset in the ice off Cape York."

His guide explained that the *Saviksue* "were originally an Innuit woman, her dog and tent, hurled from the sky by *Tornarsuk,* the Evil Spirit . . . the Woman was in shape like a woman seated and sewing." Centuries of chipping had worn away the upper part of her body and reduced her mass by perhaps one-half. Years ago a hunting party from farther north had tried to take home her head to spare themselves the 500-mile journey to replenish their iron supply. But out from shore the ice suddenly parted, plunging head, sledge and dogs into the dark

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Ship's crew and Eskimos heave on 1,000-pound meteorite called the Dog. At the shore they ferried it on an ice raft, then dragged it across the ice to ship.

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waters of the bay. The Eskimos themselves barely escaped, and ever after were content to stick with the long trip.

On his first trip to the *Saviksue* in May 1894, Lieutenant Peary excavated the Woman, measured, sketched and photographed her, and took angles for a rough map. Then, human as well as engineer-scientist-explorer, he "scratched a rough 'P' on the surface of the metal as an indisputable proof of my having found the meteorite."

A year later he stood back into Melville Bay in the ship *Kite*. Her crew climbed down to the ice, drove in the anchors and made her fast.

Between the ship and the two smaller meteorites were still a mile of ice, a stretch of open water and a final quarter-mile of uneven ground liberally sprinkled with huge granite boulders.

With the uneasy knowledge that a sudden storm or even a wind shift could lock *Kite* solidly in the pack for the ten-month winter, the ship's crew and a dozen Eskimo hunters went to work. A rough road was built around boulders and over snowdrifts from meteorites to shore.

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Chain and block pulled 34-ton Tent down slope while jacks behind pushed.

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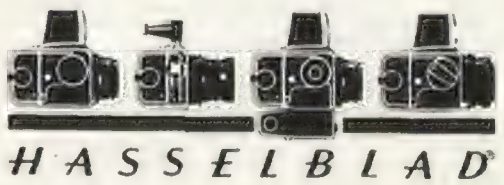

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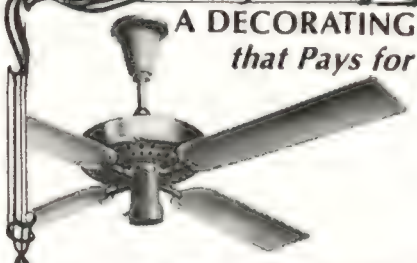

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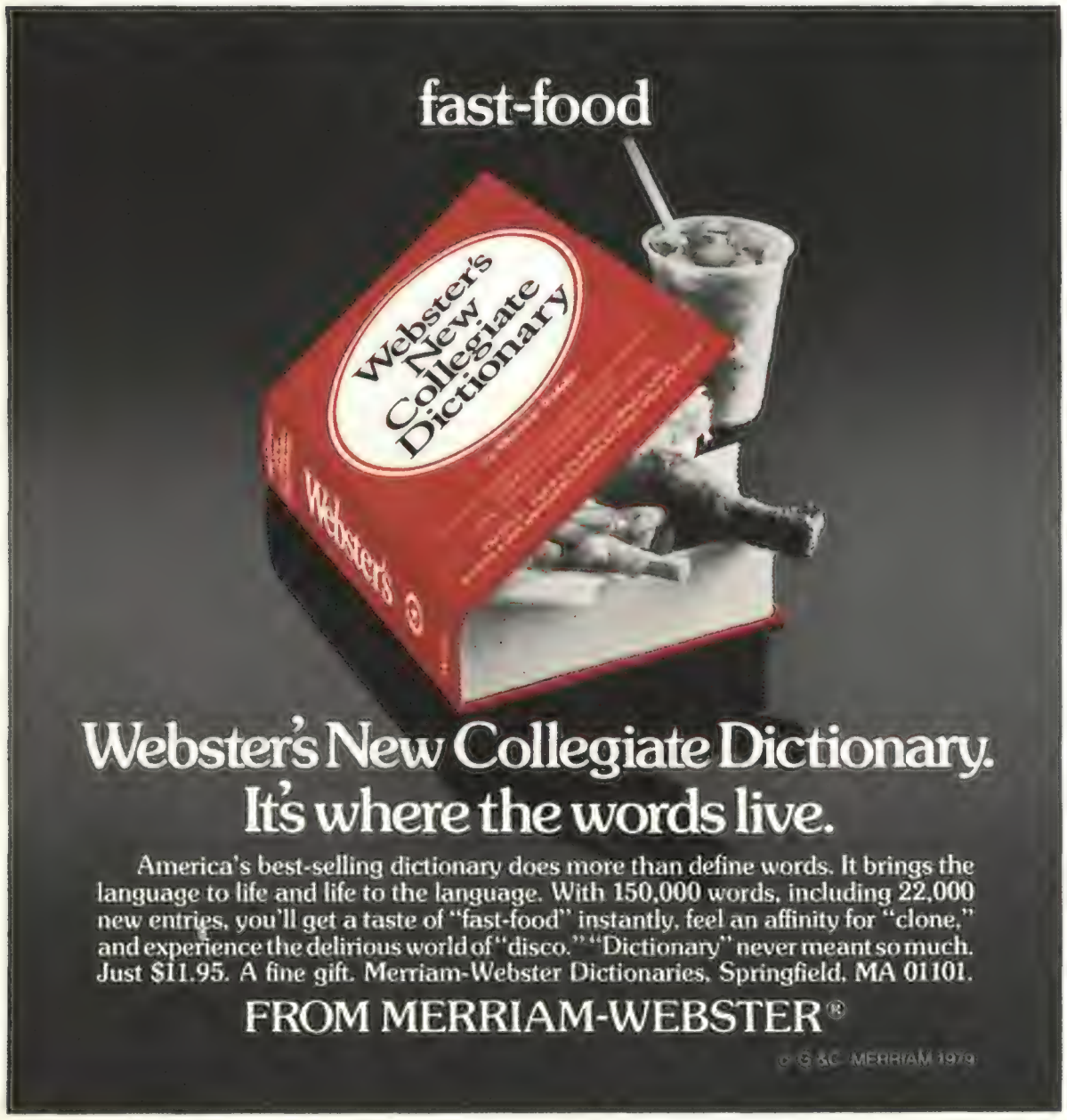
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Courtesy The American Museum of Natural History

Peary's daughter, born in Greenland, formally christened the rock *Ahnighito*.

With the help of crowbars, poles and sledges on land, an ice ferry from the bay shore and more manhandling at ship side, the Dog was hoisted aboard and lowered into *Kite*'s hold. That took 48 hours; the Woman was more difficult.

For her the crew, directed by Peary's brother-in-law, Emil Diebitsch, spiked together a heavy timber drag and with hand-pumped hydraulic jacks lifted her slowly out of her ancient bed, worked the drag in under her and secured her solidly. Ready to receive her were heavy planks placed on short iron rollers. Then with men ahead hauling, men behind prying and pushing, and other men alongside leapfrogging planking and rollers from behind to ahead, they wrestled the massive iron to the beach.

Once again a specially selected ice raft was moored and waiting. Planks were laid, and the Woman rolled aboard her ferry and poled slowly out to the ice pack.

There the pushing, hauling and repeated repositioning of planks and rollers resumed, until the drag was close enough so that all spare lines spliced together could reach from ship to iron. *Kite*'s steam winch took over and quickly brought the metal alongside.

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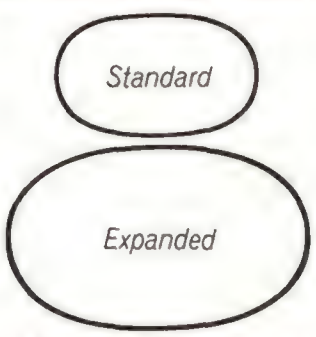

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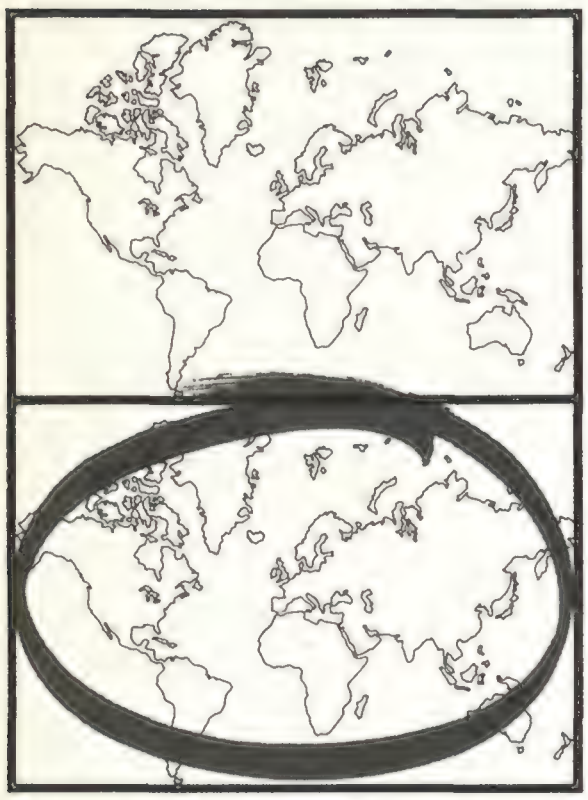

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Men struggled with rope and chain to make fast the ship's tackle, but under the iron's concentrated weight the bay ice shifted and groaned, cracks appeared beneath the drag and under foot. With a roar the ice gave way. The men leapt back or scaled *Kite*'s sides to safety. The chains and cables thrown around the metal drew rigid. The oak cargo boom groaned and quivered, and the ship herself listed slowly to port until the strange, misshapen mass dangling from the boom's end was half submerged among the remnants of the ice floe.

But there it stopped. The boom held. The men passed more lashings around the iron, the winch rattled and strained, spitting jets of steam, and slowly the dripping meteorite rose clear of the bay, then of the rail, and sank through the open hatch to be wedged securely in *Kite*'s hold for the long voyage home.

The Tent was nigh impossible. A pick-and-shovel crew dug down three feet through the eternally frozen ground of the island without approaching the bottom of the mass. But they did expose one projecting end, and under this Peary put two ten-ton screw jacks, hoping to break the monster free. The jacks were forced to the limit of their strength without moving it a single millimeter. With the two smaller meteorites safely stowed and new ice forming rapidly on the bay, *Kite* cast off and headed south.

Robert Peary was not a man to accept defeat and the next summer he was back —with a bigger ship, bigger jacks, more men and the same determination.

It was late August again, now 1896, before the ice in Melville Bay broke up sufficiently so that the powerful *Hope* could batter her way in. From the ship Peary and his men could see the dark bronze crest of the meteorite. The famous Arctic skipper from Newfoundland, Captain John Bartlett, was able to dock at a natural rock pier at the foot of the little rise on which the meteorite rested.

Within ten days the first blizzard of winter would close the bay, and so Peary launched a round-the-clock assault on the metal. Bartlett and his crew took the day shift; Peary and the Eskimos the night.

In the first few days the iron was fully excavated and, resisting every inch, gradually torn from its nest by the power of Peary's hydraulic jacks.

But the battle between meteorite and machine was not without casualties. In its earliest stages the 60-ton jack failed. Later, two 30-ton jacks also gave way, leaving Peary only the 100-tonner, almost as unwieldy as the meteorite itself.

Once out of its ancient pit, the iron was lowered onto steel rails laid on heavy

Courtesy The American Museum of Natural History

Here *Ahnighito* is poised on temporary bridge between ship and shore. Peary's own caption for this picture says only "A Temporary Hitch" but gives no details.

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Courtesy The American Museum of Natural History

With meteorite safely on board, Peary's ship, *Hope,* had to force through icebergs to get to the open sea. Being frozen in all winter was a constant fear.

timbers and then pushed by the repositioned jacks the few yards up the back slope to the crest of the rise. From the crest to the rock pier a rough road had been cleared of boulders and graded. Peary planned to roll the metal, carefully controlled, down the hill.

Every movement of the meteorite down the slope was a study in "dogged sullen obstinacy." Pushed by the 100-ton jack and pulled by two powerful chain blocks acting through a steel cable and chain straps around the metal, "the huge brown mass would slowly and stubbornly rise on its side and be forced to a position of unstable equilibrium." As the sweating, fur-clad men backed clear, a few more links of chain would be hauled rattling through the blocks, "the top of the meteorite would move almost imperceptibly forward, the stones under the edge of the revolution would begin to splinter and crumble, then, amidst the shouts of the natives and our own suppressed breathing, the Iron Mountain would roll over . . . the harder rocks would elicit streams of sparks from its brown surface before they crumbled, the softer ones would dissolve into dust and smoke, and the giant would bury itself half its depth . . . throwing up a dam of earth and stones. . . ."

At the bottom of the slope the rail-and-timber technique was resumed, but even here the iron resisted with every ounce of its concentrated black mass. If in moving it slipped and fell even half an inch, as it often did despite all Peary's precautions, "it would bite into the steel rails like a punch, and the rail itself would sink into the timber beneath. . . ."

The weather turned increasingly cold. New ice began to form and thicken around the island.

In the nightmare weather, the men worked on, bearded, red-eyed, sweating and evil-smelling, tugging at the chain falls, pumping at the one remaining jack, digging, cursing, inching the monster toward the ship.

Then, with only yards to go, a furious southeast gale brought down the first blizzard of the winter. It tore apart the iceberg barrier. Sea ice, which the bergs had held back for the ten-day summer, drove in upon shore. The iron from the depths of space had won again.

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Hastily the monster was blocked a foot or so above the ground to be left for the winter. The men hauled their gear aboard and the ship was barely under way in time to avoid being splintered between ice and rocks.

"Disappointed, but not discouraged," as Peary put it, and armed with the harsh experiences of the summer, he spent the winter months gathering the equipment, materials and men he would need, and in drawing up plans for a final assault on the Tent.

On the 12th of August, 1897, *Hope*'s ironclad bow butted a passage between the ice floes, and she tied up once again at the rock pier where the meteorite squatted on its blocks. She was greeted with a driving snowstorm which turned what had been open water into a slushy emulsion.

In weather that changed only to alternate between snow and fog, Peary hoisted out his gear and set his men to work leveling the edge of the pier and building a heavy timber bridge base on it.

Meanwhile, Captain Bartlett prepared the ship to receive her ponderous load. First, the ship's hold was filled with coarse rock ballast both to steady her and to absorb and dilute the shock in case the iron should fall accidentally. Then *Hope*'s main deck amidships was heavily reinforced so it would not collapse under the meteorite, and an almost solid layer of heavy timbers was spread across it to distribute that weight.

The next step was to build a bridge to span the 18 feet of open water between ship and shore. Its main members were two 60-foot lengths of 14-by-16-inch white oak weighing 6,000 pounds apiece.

On each timber were spiked, side by side, two 30-foot standard steel rails. Two more 15-foot rail lengths on each timber reached across the main hatch, into which the iron was to be loaded.

Then, a "car" on which it could move across the bridge and be lowered into the hold was built. This car, almost as heavily constructed as the bridge itself, was of seasoned timbers secured with bolts of Swedish iron, its underside sheathed with steel plates.

When the rails had been greased with soap and tallow, the ship's heaviest tackles led from the car to the steam winch, the great jacks placed to push, the ship perfectly positioned and the tide precisely right, all was ready.

Peary lifted his little daughter, Marie Ahnighito, born in Greenland only four years before and named for an Eskimo woman. "While Mrs. Peary and Captain Bartlett, at the levers of the jacks, started the monster, draped in 'Old Glory,' toward the ship, the baby dashed a little bottle of wine against it and christened it 'Ahnighito.' " Marie Ahnighito was, of course, my mother.

Courtesy The American Museum of Natural History

Nine years after arrival in New York, the iron was ferried from Brooklyn to Manhattan, hauled by 14 horse teams to American Museum of Natural History.

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Courtesy The American Museum of Natural History

When the Hayden Planetarium was built onto the museum in 1935, *Ahnighito* was moved again, became major exhibit there. Planetarium was built around it.

Car and cargo inched out upon the bridge. "In an hour from the time it started, a motion of my hand stopped the winch with the meteorite precisely over the main hatch," wrote Peary. At that moment the weather broke. Patches of blue sky opened overhead, "the horizontal rays of the low midnight sun . . . fell upon the meteorite, changing it into molten bronze."

The snow which had filled the skies off and on all week began to fall more heavily as *Hope* cleared the island for the last time. A leathery slush dragged along the sides of the ship, and the ever-present southeasterly wind had shifted the icebergs of Melville Bay so they blocked *Hope*'s access to the open sea.

Repeatedly she rode up on the ice. Large pieces broke off and were sucked aft as she backed off until only two icebergs barred her passage. *Hope*'s skipper put her bow between them, and the engineers gave him everything they had. "*Hope* herself was pulsating like a human heart. Inch by inch we squeezed between the frozen blue rocks. . . ."

At Cape York, a few miles westward, they dropped off most of Peary's "faithful Eskimos," rewarded with barrels of biscuits, knives, guns, ammunition, and then headed for home. Within hours, a savage polar gale howled down around the ship and while she fought her way to shelter in the lee of an island, Peary and "four of my bravest Eskimos worked like miners in our timber-cage under the meteorite, lowering it with the jacks, inch by inch and foot by foot, in order to get it low enough not to endanger the ship's safety."

At Godhavn he lowered *Ahnighito* to the limit and packed it in even more solidly before facing the bludgeoning that previous crossings of Davis Strait had taught him to expect. He was not disappointed, as "an inferno of Arctic hellishness, a furious horde of scourged, bitter-cold waves rose . . . only to be lashed down by the merciless wind, until in savage revenge they rushed upon the *Hope* like Arctic wolves, and poured over her rail as if to devour her."

Captain Bartlett was handicapped as no deepwater sailor should ever be. He had no compass. It was there, in its brass binnacle, between the compensating spheres as usual. But its north-seeking needle now pointed with undeviating determination to the lump of magnetic iron in the hold.

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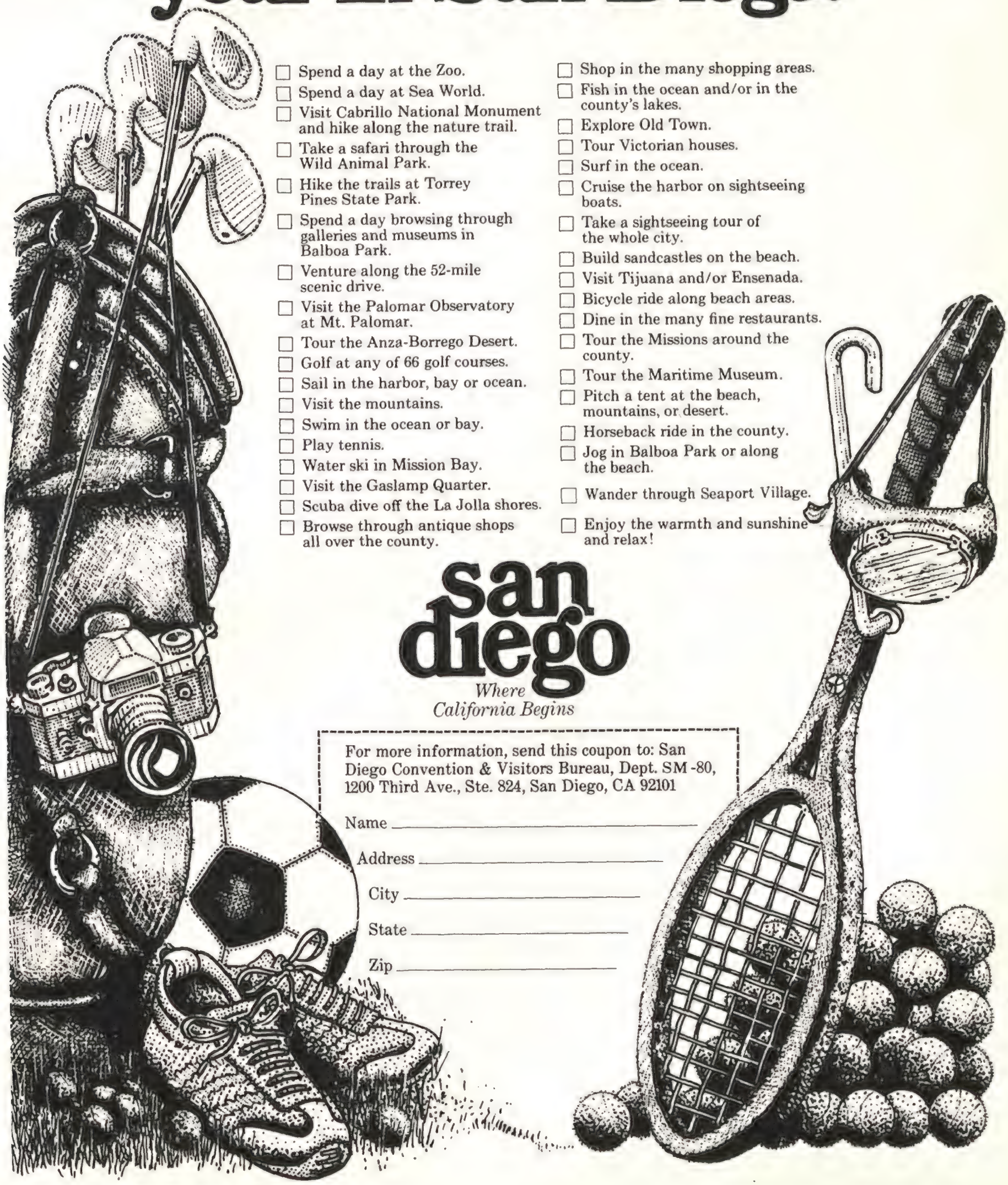

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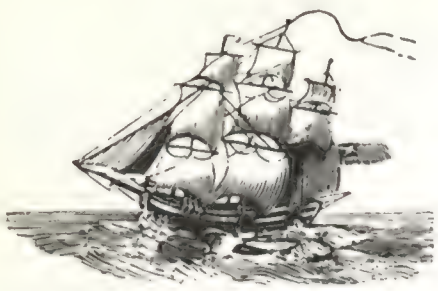

"One hand for the ship, one hand for yourself"! The old sailor's warning cry springs up anew in the Smithsonian Institution's new Hall of American Maritime Enterprise in the National Museum of History and Technology. As you walk through the exhibition, you can almost smell salt water, weathered timber, caulked teak planks, and sense the turbulence of the sea. Elsewhere, you can survey the broad reaches of the Mississippi from the pilot house of a river towboat. America's ocean-going past, as well as the heritage of her inland waterways, can be better understood by visitors of all ages after seeing these artifacts ranging from the time of the Mayflower to World War II's shipyards.

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So he could only keep the northwest gale on his starboard quarter and hope it would blow itself out before the rocks of Baffin Island appeared below his bows.

By September 9, the storm had spent itself and *Hope* coasted through relatively gentle seas in the lee of Labrador.

Less than a month later, on Saturday, October 2, 1897, a Navy 100-ton floating crane came alongside her at the New York Navy Yard and hoisted out the unearthly iron in a giant sling of chains. In 1906 it was moved across the East River and through the streets of Manhattan, by barge and a block-long procession of horse teams, to The American Museum of Natural History. Twenty-nine years later, the Hayden Planetarium was built around *Ahnighito.* Last fall it and the Woman were lifted through a 10-by-12-foot hole cut into the building's west wall and hauled two blocks to their new home in another corner of the museum.

Early this spring several members of my family and I trooped into the huge, partially completed Ross Hall for a sneak preview of the *Saviksue.* There were the Woman and the Dog, and in the middle of the room, meticulously positioned on six steel pillars extending right down into the building's foundations, was the stubborn *Ahnighito.*

Last September the meteorite was moved once more to new hall in main museum.

Courtesy The American Museum of Natural History

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Train buff Link dons engineer's cap for ride on his steam locomotive that meanders for two miles through swamps and forest near his Florida home.

By Michael Wallis

A creative engineer of air and ocean wins a signal honor

Inventor Ed Link receives Lindbergh Award for 50 years of innovation in aviation and underwater exploration

Edwin Albert Link looks his age. Years of soaring through icy winds have etched his face. Salt water has seeped into his veins from countless dives under water.

The man whose invention enabled more pilots to learn to fly than any in history, and who helped train Amelia Earhart to use flight instruments, now relies on glasses and a hearing aid. Many of his contemporaries—Wiley Post, Eddie Rickenbacker, Howard Hughes—are dead. Link—tall, tanned and balding—is on his third pacemaker.

His reputation spans heaven, Earth and ocean. Link barnstormed with the aces of the Lafayette Escadrille and passed the time of day with Orville Wright. Link has helped the space program succeed and holds 33 patents in aviation, navigation and ocean engineering.

At 75, Ed Link—pioneer aviator, inventor, engineer, industrialist, oceanographer—has the composure of a crusty old pelican. He is a survivor.

"I find I have to ration myself," confesses Link, "but I enjoy my work. I've often said it, and I mean it, that I have never worked a day in my life."

This month Link will be saluted for his more than half-century of pleasurable labors above and below the waves. Leaders from the aviation and aerospace industries, government and the sciences will gather in New York when the Charles A. Lindbergh Fund Inc. presents Link with its 1980 Lindbergh Award. The fund, es-

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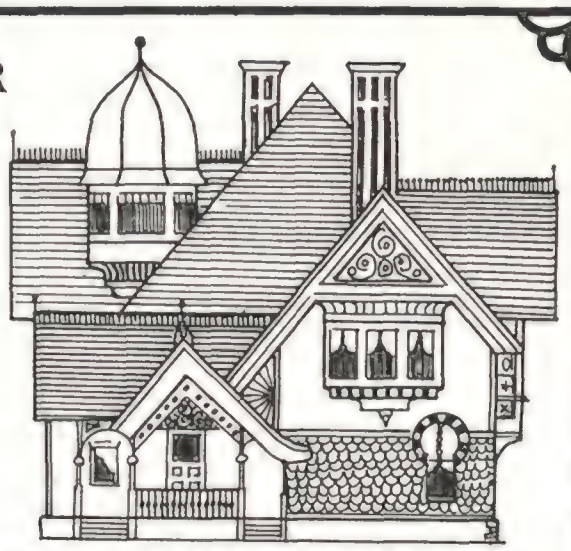

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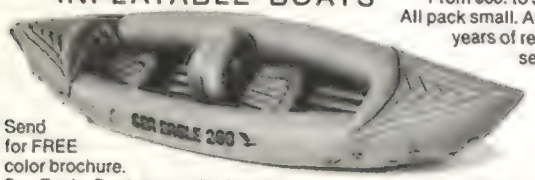

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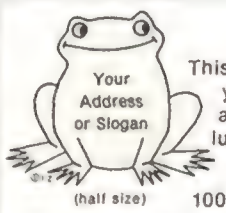

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This November 1927 photograph shows Link (right) posing with fellow pilots.

tablished in 1977 on the 50th anniversary of Lindbergh's transatlantic solo flight, recognizes achievement in science and technology combined with preservation of the natural environment.

From Link's long list of achievements, the Fund singled out his invention of the Link Trainer (p. 156), and his submersibles, which give Man new and benign access to the oceans.

Lindbergh once said: "The Human Future depends on our ability to combine the knowledge of science with the wisdom of wildness." He could have been talking about Edwin Link. Lindbergh's son Jon, who has worked with Link on deep-diving experiments, said: "Link is not only innovative and technically oriented, but also close to the environment. He believes in follow-through and getting the job done. I know that he's taken risks that he felt were worth taking when the objective was considered."

For the past decade Link and Marion, his wife of almost 50 years, have lived and worked near Fort Pierce on Florida's Atlantic coast. Surrounded by citrus groves and mangrove swamps and with alligators basking only yards away, Link helps direct a staff of 150 scientists, engineers and support personnel at Harbor Branch Foundation Inc., a unique oceanographic center where research and engineering have united to create the hardware needed to explore and study marine life.

Author Michael Wallis is a free-lance writer based in Miami, Florida.

Charles Lindbergh (left) made his historic transatlantic flight the previous May.

"People ask me why I ever went into the ocean," says Link. "They say it seems so peculiar for a man who spent most of his life in the air to go to the sea. I tell them there is no difference between air and water except water's thicker. The problems are very much the same. What I have done is apply what I learned about air navigation to the sea."

The complex, named Link Port, includes scientific and engineering laboratories, a computer center, electron microscope, library and reference museum, aquaculture-mariculture facility, dry dock and a fleet of more than a dozen research vessels.

"I spend as little time in the office as possible," says Link. Instead of shuffling papers, he patrols the 300-to-400-acre facility, stalks the lab and the outdoor work areas.

Link doesn't miss a thing, his eyes dancing over equipment, as he offers congratulations to workers for jobs well done and doles out advice to technicians who toil on undersea vehicles that would put Jules Verne to shame.

"These are good people," he says as several workers guide one of the famed Link submersibles toward Link Port Channel waters for a test dive. "I'm still very active and all, but much of my work is done by a very excellent staff. That's my real secret," he says with a wink.

"Edwin Link is a one-man show," says Marshall Flake, a submersible pilot at Harbor Branch who has worked with him for the past eight years. "He has a

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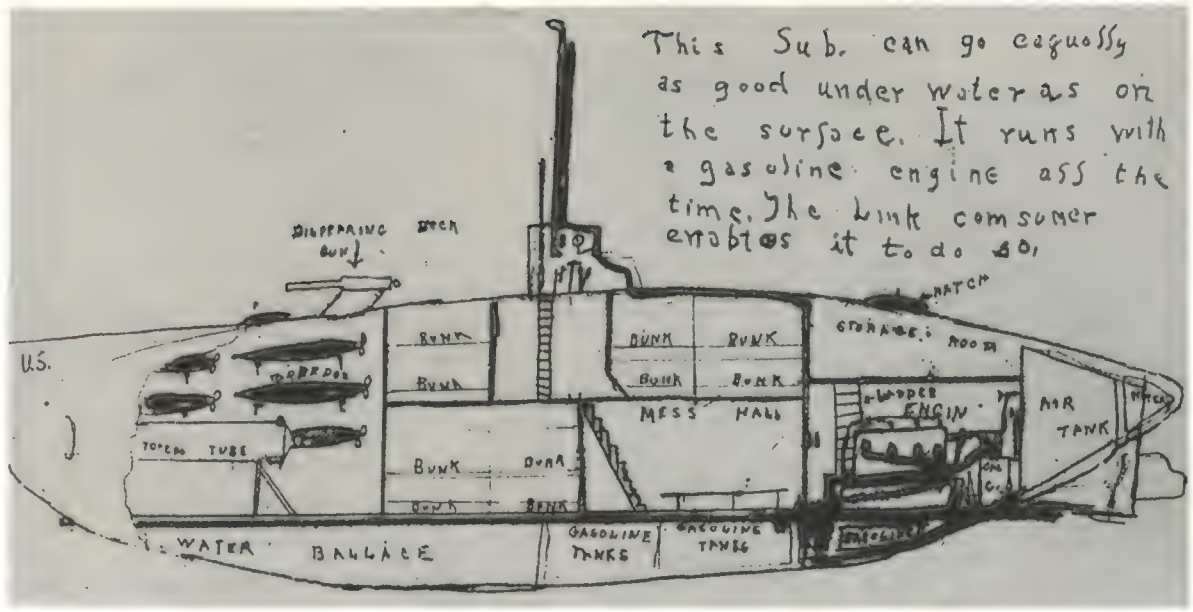

Ed Link designed this submarine at the age of 12. Unfortunately, it wasn't very practical, he says in retrospect; it most assuredly would have sunk.

hands-on approach to engineering. The man is absolutely not afraid of innovation. He says the hell with red tape, the hell with delays. He forges ahead. He's a go-for-it-type man. He'll have inventions floating around in his head on the day he dies."

Link learned to fly in the 1920s, but the high cost of flying lessons and the long lines of fledgling pilots waiting to get airborne bothered him. He searched for a solution. When he was 24, he built his first flight trainer in the cramped basement of his father's factory in Binghamton, New York. The cockpit, with a simulated instrument panel, would permit novices to learn to fly without leaving the ground.

But business did not boom. There were few customers for the Link Trainer until 1934, when the U.S. Army Air Corps was abruptly given the task of carrying air mail. The corps pilots, trained to fly by watching the ground, couldn't handle the job. After ten pilots cracked up, the Air Corps turned to Link's invention.

During World War II the Link Trainer was used to teach more than half a million airmen. Today Link Trainers and simulators are produced for pilots, astronauts and maritime vessel operators. Visitors to the Smithsonian's National Air and Space Museum can take a five-minute simulated flight in one of three Link General Aviation Trainers that are on display there.

In 1959 Link retired from the aviation business to begin his new career in underwater research and archaeology. During his 20 years as an underwater voyager and inventor, Link has created submersible craft that have helped to revolutionize oceanography. He designed and built an oceanographic research vessel, *Sea Diver*, which was used on archaeological research cruises. In 1960 Link began developing equipment that would actually "put men in the sea." There was *Deep Diver*, the first practical submersible with an exit hatch for divers to leave the vessel and work on the ocean floor at great depths. Then the *Johnson-Sea-Link* submersible was developed (SMITHSONIAN, April 1971).

"Our submarines," says Link, "have acrylic spheres so scientists have 360-degree vision and can go to depths of 2,000 feet, observe the life there, pick up specimens, put them in baskets and then bring them back to the lab for further study. I want to be able to allow scientists the opportunity to make their observations at close quarters and see the various forms of life in their natural habitat.

"You see, scientists are just like that—they are scientists. They're not divers and some of them aren't very good seamen. They're a little bit scared of the ocean. What we've done is to give them a way to sit comfortably on the deck of a boat, look through a television camera, take pictures and reach out and seize something and bring it to the surface."

The sailing hasn't always been smooth. A personal tragedy prompted one of Link's most important inventions.

In June 1973 Link and his crew on the *Sea Diver* were on a routine research mis-

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sion for the Smithsonian Institution off Key West. It was a bright Sunday, Father's Day. Link's younger son Clayton, 31, and three others took the *Johnson-Sea-Link* 350 feet down to scout around a sunken Navy destroyer. Suddenly strong bottom currents swept the minisub into a tangle of cable and debris. Link led rescue efforts from the deck and after 31 hours the *Johnson-Sea-Link* was extricated and brought to the surface. The two men in the acrylic bubble survived, but the divers —Edwin Clayton Link and Albert D. Stover—had suffocated in the dive chamber long before the rescue.

"We're not going to stop," Link vowed after the accident. Two years later he developed a submersible that would prevent the kind of accident that took his son's life. The Cabled Observation and Rescue Device (CORD) is an unmanned submersible equipped with television cameras, hydraulically powered claws and cutters to rescue divers trapped under water.

Much of Link's current work at Harbor Branch is focused on the study of Man's relationship with the sea. Shrimp are being raised on sewage effluent, tools for underwater archaeology are being created, and marine animal and plant life is being scrutinized. One ambitious project on the drawing board would harness energy in the Florida current.

Since 1973 Link has helped with the

Link's "Blue Box" flight simulator helped train thousands of World War II pilots.

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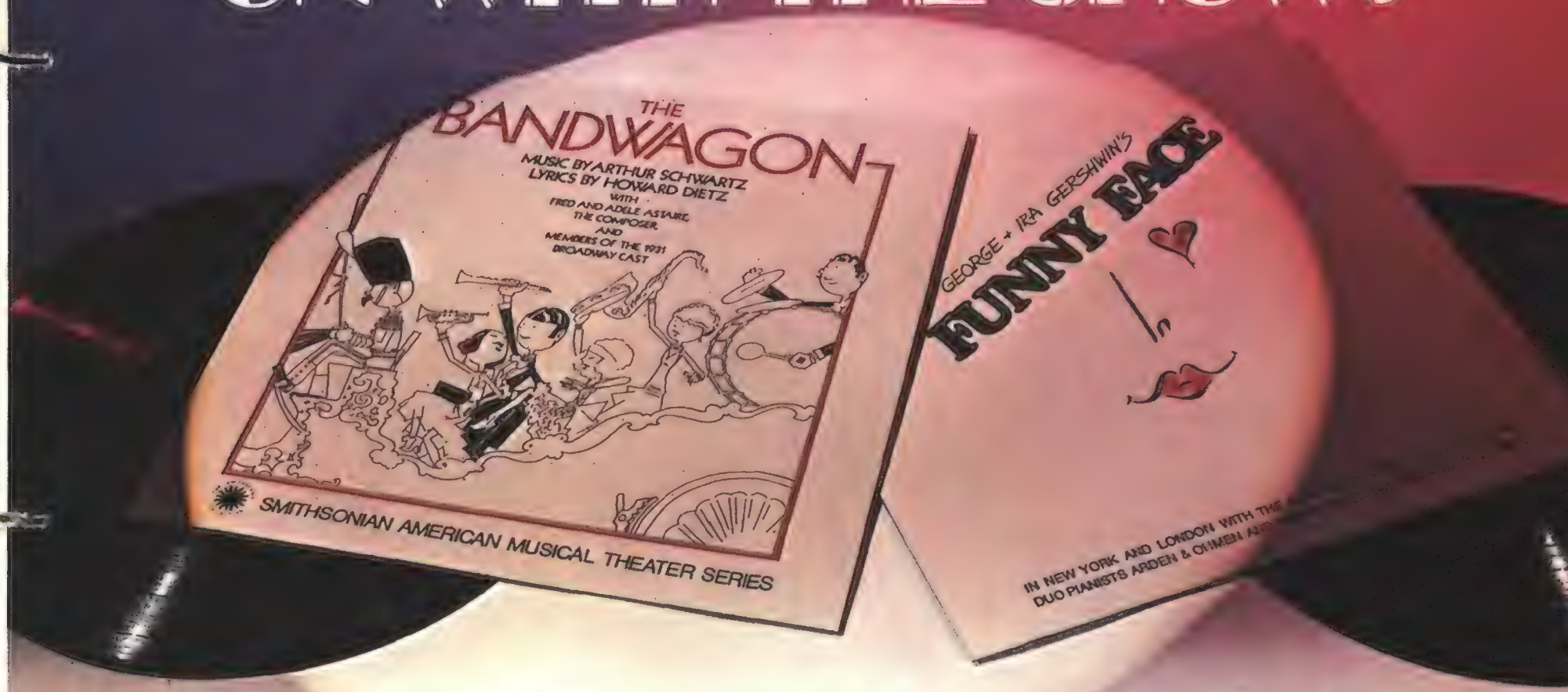


There's no business like show business . . . and there's no record series like the Smithsonian American Musical Theater Series! Cast albums today are nothing out of the ordinary, but before 1943 there was no such thing. But there were the songs, often recorded by the stars, the featured players, and the composers. The Smithsonian has tracked down which stars recorded what songs for which labels—piecing out those with broadcast material and even piano rolls. The result . . . as close as you can get to experiencing the original show.

The Band Wagon—This recording recaptures the theatrical magic of Dietz and Schwartz's highly innovative musical revue. The 1931 hit features the brother–sister team of Fred and Adele Astaire (her farewell to the stage) and the lyric *Dancing in the Dark.*

Funny Face—Another Astaire hit! With brother Fred as guardian and sister Adele as his flapper ward **Funny Face** opened to raves in November of 1927. And a sibling success it was—with Ira and George Gershwin penning such memorable songs as *'S Wonderful* and *My One and Only.*

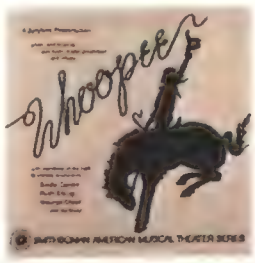
Let's Face It
Wit and elegance abound in these three Cole Porter shows. The 1941 reconstruction of **Let's Face It** features the antics of a young Danny Kaye. Selections are also included from the 1936 production starring Ethel Merman (**Red, Hot and Blue!**) and the 1938 show which introduced a demure Mary Martin (**Leave It to Me!**). *Including: Ev'rything I Love • My Heart Belongs to Daddy*

Lady, Be Good!
The original 1924 production is reconstructed with performances by Fred and Adele Astaire (one contains *his* first dancing on records) and by George Gershwin himself. The selections have been taken from several sources, including some Gershwin radio broadcasts. *Including: Oh, Lady Be Good • Fascinating Rhythm • Half of It Dearie Blues • Hang on to Me*

Oh, Kay!
A Long Island bootlegging operation is the setting for this musical written especially for Gertrude Lawrence. Frequently revived, selections from this popular Gershwin show are now available in a 1926 edition—with performances by Lawrence, Gershwin, and duo pianists Arden and Ohman. *Including: Someone to Watch Over Me • Do, Do, Do • Clap Yo' Hands • Maybe*

Souvenirs of Hot Chocolates
Featuring music composed and performed by Fats Waller, this all-black revue marked the Broadway debut of Louis Armstrong. Songs, comedy sketches, and dance numbers are all part of this night club show so opulent that it was moved to Broadway. *Including: Ain't Misbehavin' • Sweet Savannah Sue • Black and Blue*

Ziegfeld Follies of 1919
Enthusiastic audiences applauded Eddie Cantor, Bert Williams, John Steel, and the popular team of Van and Schenck in the 1919 edition of the Follies. This album features those stars performing 17 numbers, five composed by Irving Berlin. *Including: A Pretty Girl Is Like a Melody • Mandy • You'd Be Surprised • I've Got My Captain Working for Me Now*



Whoopee
Eddie Cantor, Ruth Etting, and George Olsen's band and singers are all here on this reconstruction of Ziegfeld's Wild West extravaganza. The musical program is almost complete, including an overture. *Including: Love Me or Leave Me • Eddie Cantor's Automobile Horn Song • Makin' Whoopee!*

Anything Goes
Since its 1934 Broadway triumph, this shipboard musical comedy has been an American favorite. Archival recordings made by the original New York and London cast members—including Ethel Merman—and by Cole Porter himself recreate the 1934 show. *Including: I Get a Kick Out of You • You're the Top • Anything Goes • Blow, Gabriel, Blow.*

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The Links spend most evenings quietly at home, the warm waters of the channel only feet away. Beyond are the Indian River and the Atlantic.

"I don't think about the ocean as a roaring thing," says Link. "I think of the sea as a part of the world that not much is known about—an undeveloped place that will help support and sustain us. I'm not much on the idea of sea colonization. Some people talk about living underwater; I have and find it damn uncomfortable. I think we are animals that were made to live on the surface but our curiosity and needs are such that we go under the water to work. The ocean is like a coal mine—you can work there but you sure don't want to live in it.

"I do think there's hope for the ocean. Many think we've already ruined it—I don't agree. We are spending more time trying to understand its mysteries, to save it. I think we are getting smart."

Link examines the "critter-gitter," which collects plankton from the ocean.

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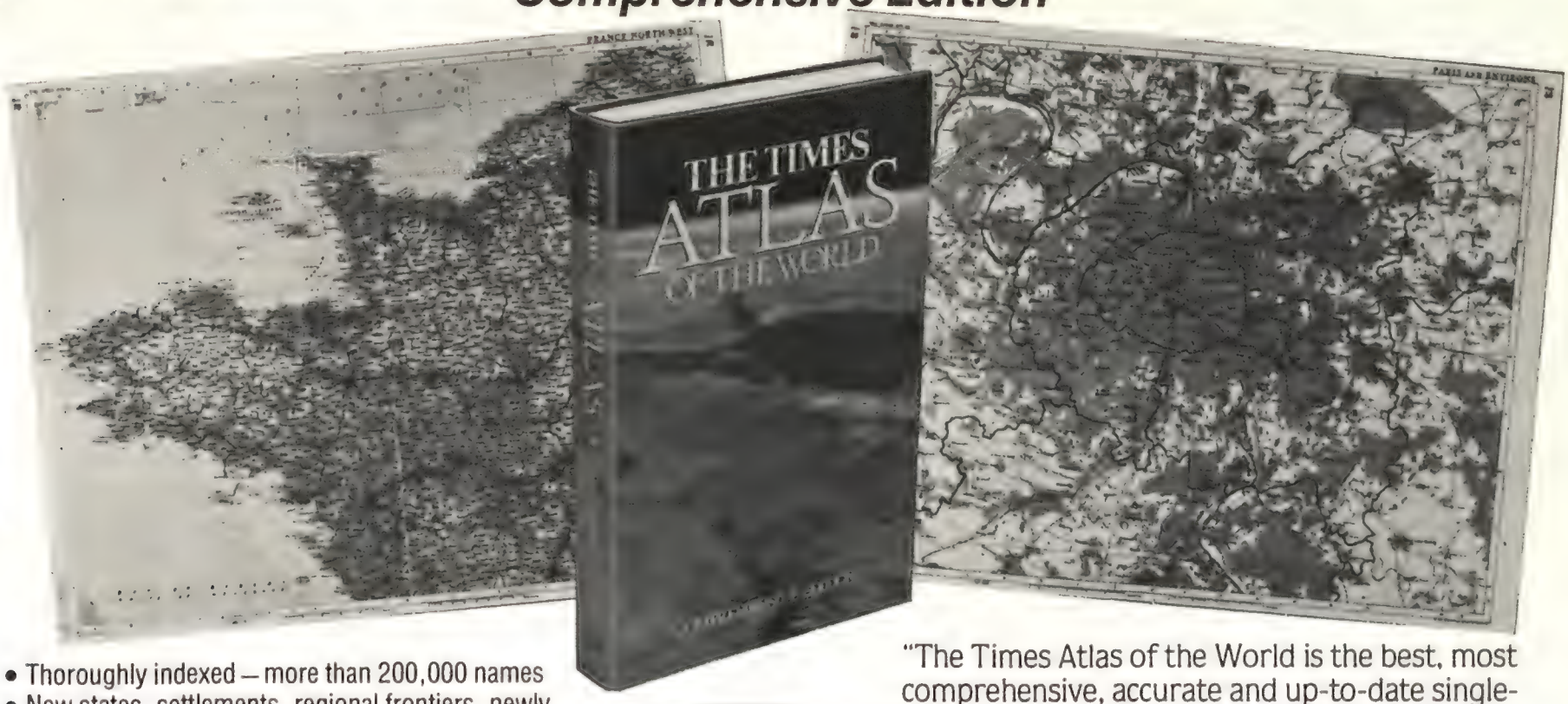

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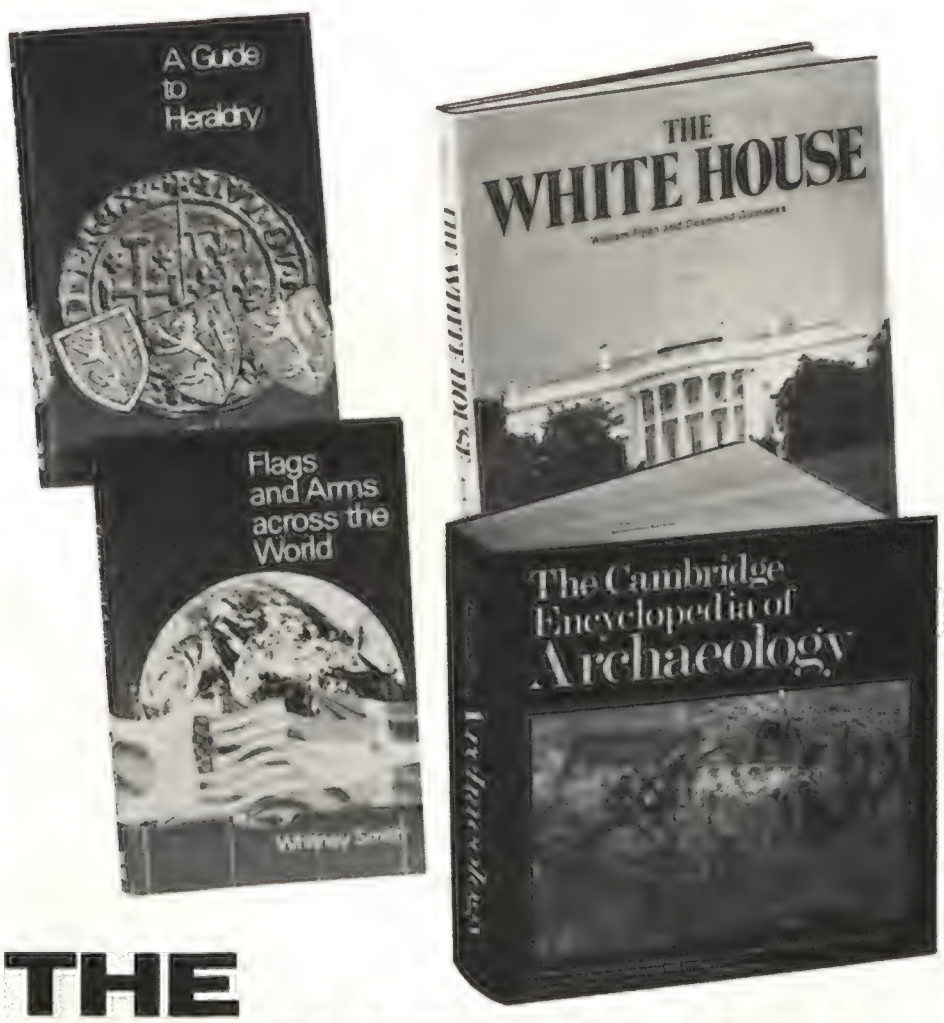

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Book reviews

The Tree
John Fowles and Frank Horvat
(Little, Brown, $24.95)

Nature, asserts novelist John Fowles, is magnificently, transcendentally itself, beyond all scientific nomenclature and utilitarian function. Likewise, his remarkable book, *The Tree,* produced in collaboration with photographer Frank Horvat, defies neat categorization. A book-length essay that is at once autobiographical, philosophical and lyrical, it is, in addition, a meditation upon Western history and art, a critique of current culture and a statement of esthetic theory and practice. More, it contains a gallery of landscape photographs, a stunning one-man exhibition on a single theme. Prose and photographs focus on nature—represented by the tree—and on Man's relationship to nature—as well as to art, truth and, ultimately, his unique being.

Fowles begins by contrasting himself with his father, who boxed, pruned and cosseted a patch of apple trees in a small suburban garden near London. That carefully cultivated plot Fowles sees as emblematic of the straitened boundaries of Man's world. Most of Man's conceptualizing—like good fences—excludes, and thus distorts and deprives, reality. This penchant for limiting and labeling is an essential part of the scientific method, the legacy of 18th-century botanist Carl Linnaeus. But what was meant to be one approach to the world has been misapplied, universally extended—Fowles says—so that every aspect of life is now systematically prodded, weighed, observed, translated into equations and axioms.

As a sibling of nature, a branch of the same tree, art has suffered, having become "increasingly scientized (and dreadfully serious)," existing not for itself but for purposes of labeling and analyzing. We are so "patterned and persuaded by the tone of the more serious reviewing of art in our magazines and newspapers that we no longer notice their overwhelmingly scientific tone, or the paradox of this knowing-naming technique being applied to a nonscientific object. . . ." We murder to dissect.

Plane trees in April, Var, France

For the key to his own fiction, Fowles advises critics to look not to literary influences and "all the rest of that purely intellectual midden which faculty hens and cocks so like scratching over," but to trees. In trees, with their variousness, freedom, beauty and explorability, Fowles finds the best analogue to prose fiction. His account of the writing process will be an invaluable aid to admirers of *The Collector, The Magus, The French Lieutenant's Woman,* and his most recent novel, *Daniel Martin.*

To be sure, Fowles is no romantic anti-scientist. In science, general knowledge is indispensable. But, Fowles emphasizes, reality consists in part of the inexplicable; it cannot be mounted wriggling in a display case.

Having bitten the apple of scientific knowledge, he feels, we are the poorer, and our defoliated world has shrunk and become alienated from us. We are strangers in a wasteland of our own devising. Hope, Fowles recognizes, does not lie in any kind of conservation movement, but within the individual—in a change of heart, a cleansed view. Fowles' prescription calls for a complete metanoia. We must recognize, he writes, that knowing nature fully is both an art and a science; that "the heart of this art lies in our own personal nature and its relationship to other nature"; and that this kind of knowledge is not "reproducible by any other means—by painting, by photography, by words, by science itself."

A major strength of this book is Fowles' perception of the paradox at its core. Horvat's rhapsodic photographs of trees and woodland settings from Europe to America frame, and by that framing, restrict. Fowles also recognizes that like his father he has, by the medium of words, indulged in his own bit of husbandry, though all the while protesting, as T. S. Eliot wrote in the *Four Quartets,* that "Words strain, Crack and sometimes break, under the burden. . . ."

As a finale to this many-branched essay, Fowles attempts what by his own admission is nearly impossible, yet what he has been approaching since the beginning: an account of his own response to nature. He chooses a landscape in southern England, Wistman's Wood, "a half-mile chain of copses splashed, green drops in a tachist painting. . . ." Attempting to name the nameless, he recognizes the futility of his misappellations: "It, this nameless-

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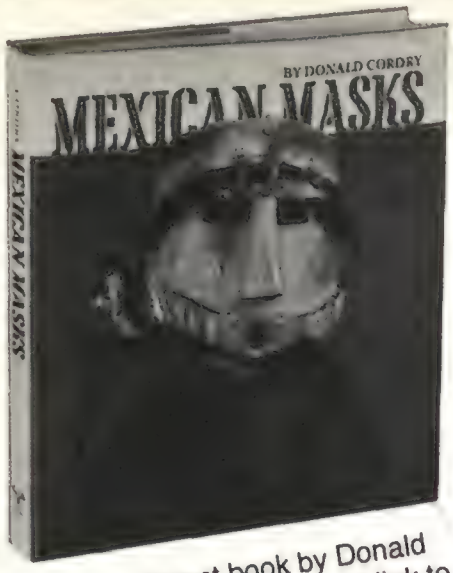

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ness," is beyond science and the arts because its "secret is being, not saying."

Certainly Fowles' ideas are not original. Plato first perceived that our notion of reality is several removes from reality itself. Great thinkers from Aristotle to Aquinas to Kant have only concurred. But what is arresting is Fowles' presentation: his graceful blend of the personal and the general, the symbolic and the factual, the past and the present. His prose is allusive, complex, multilayered. With Horvat's eloquent, exquisite photographs, *The Tree* is a distinctive achievement.
—Paul Piazza
Author, *Christopher Isherwood: Myth and Anti-Myth*

The Southwest
David Lavender
(Harper & Row, $15.95)

When he first encounters the clear, sun-blasted beauty of the American Southwest and the colorful, casual life-style of the region, the urban refugee is both awe-struck and enchanted. Only after he is reminded of the profound troubles that lie just beneath the surface is he persuaded that he has not died and gone to heaven. Surely, he pleads, these people will not permit their uniquely favored corner to go the way of so much of the rest of the country; surely, they will solve problems caused by drought, poverty, ethnic hostility and by human greed and perfidy before it does.

David Lavender, who has researched the subject exhaustively, is not altogether hopeful. He offers solutions, and they are practical and within public capability. But given the record—and Lavender in this admirable example of popular history gives some 5,000 years of it—the Southwesterner, from earliest hunter to today's politician, is apt to go for the short-haul expedient when he faces endemic problems. It will get him through the next generation or so before his errors become uncorrectable.

Lavender argues persuasively, with the momentum of its long and turbulent story behind him, that a conscious slowdown is the only alternative to allowing the American Southwest to become so overburdened by development that it cannot recover, to watching the compelling beauty and special quality of life that characterize its still spacious expanses disappear. He sees signs of modest

enlightenment; divergent groups with rival interests are beginning to communicate and the government is trying some imaginative new solutions to right ancient wrongs. But the hour is late. Indian and Hispanic resentments still run deep, and the environment increasingly suffers from the old pioneer spirit of rapine and plunder that statesmen once called Manifest Destiny.

While it underscores Santayana's dour admonishment to those who do not recall history (at the terrible expense of repeating it), *The Southwest* is both a lively story and a comprehensive reference. Its most obvious shortcomings may stem from that apparent contradiction. The book tends, by its author's strenuous effort to get everything down in 300 pages or so, to be confusing in those places where he crowds names, dates, biographies, geography, military campaigns, Indian raids, wagon routes and trading ventures into dense paragraphs. And he occasionally gives in to the popularizer's temptation to take liberties in the name of more vivid history.

Mexican traders, he notes, while encouraging innocent groups of entrepreneurs from St. Louis to visit New Mexico, inform them that the people there will welcome them "deliriously." Governor David Meriwether, trying to sell the Navajos on the advantages of their confinement within a prescribed area, "cooed persuasively" to their headmen. And there are passages of headlong prose and compound adjectives that the author should be penalized for piling on.

But there are many more passages that are riveting in their very vividness. In his introduction, Lavender describes mountains in southern Arizona as "naked, jagged, and tortured by the weather. They are not durable. Exfoliating relentlessly, they are slowly burying themselves in their own detritus." Later, this poetic description of the summer fair at Taos places the reader directly in the setting: "the soaring, green-blue backdrop of the Sangre de Cristo Mountains, a dance of crystal streams, a gray sage plain, and then the deep basaltic gorge of the Rio Grande. Trails converged like crooked spokes . . . thousands of horses grazed on a swampy meadow near Taos Pueblo. Its inhabitants, dressed in white cotton, and Hispanos gay in bright serapes, wandered among the encampments with a proprietary air."

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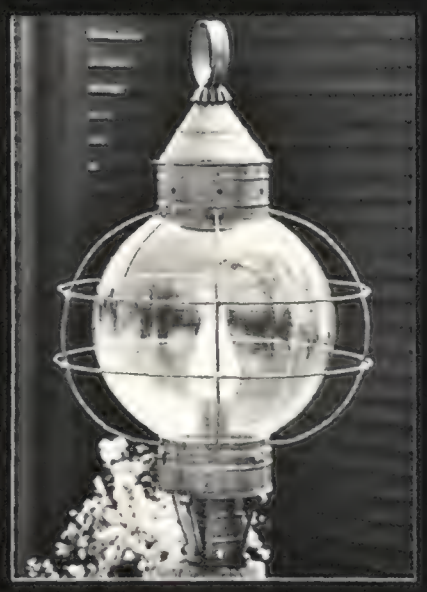

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Lavender has authored 15 books on western America. The seven-state region he examines in this one was for centuries a forbidding panorama that tested the character and endurance of all peoples—the primitive Anasazi, the nomadic Apaches, the Spanish conquerers, French trappers and American traders—who ventured there. Then, during World War II, the Army and Air Force trained thousands in Arizona and New Mexico and the atomic age was born at Los Alamos. The rush to the Sunbelt, which began after World War II, has brought the Southwest's latest conquerors. A major emphasis of the book is on the Indians who, although defeated by the American and Mexican armies, have reemerged as a force to be reckoned with. They live uneasily, among "cherished feelings of separateness," also held by their Spanish-speaking and Anglo neighbors.

I recommend *The Southwest* with enthusiasm. Good maps and a comprehensive index are of great help, and an extensive bibliography will aid the serious student of the region.

—*James Idema*
Writer and editor

The Streets of Paris
Richard Cobb
Photographs by Nicholas Breech
(Pantheon, $17.95; paperback, $8.95)

Richard Cobb explains in the introduction to this engaging, unconventional guidebook, "Paris *should* be walked, because much of it, the most secret, the most modest, the most bizarre, the tiniest, is only discoverable by the pedestrian who is prepared to push behind the boulevards and the long straight streets of the Second Empire and the early confident years of the Third Republic."

The Streets of Paris presents a very smooth, intelligent collaboration between social historian and photographer. Cobb, a scholar of France's working classes and a subtle prose artist, for many years lived in Paris and has walked everywhere in it. His Paris, captured handsomely in the photographs of Nicholas Breech, is one of secret gardens and dank alleyways, café bars where old men in berets sit with time on their hands, and half-hidden courtyards hung with washing. It is a Paris reminiscent of Balzac. As the author makes clear, it is also a Paris increasingly threatened by demolition.

Five *arrondissements* are presented in this walking tour, and they comprise but a tenth of the total area of Paris. In pictures and accompanying text, Breech and Cobb try to capture the distinct flavor of each neighborhood by showing the variety of small shops and common trades that continue to flourish, almost miraculously, in the face of change. Taken in the piercing light of October, the photographs seem haunting. A mark of death lies on many places: an abandoned schoolhouse; a small, anonymous hotel with leprous walls; a *blanchisserie* that once returned shirts "pinned up in pink paper" and is now boarded up.

October in the rue Poliveau—two old men "with time on their hands."

"I do not like what is happening to Paris," laments Cobb, "and I greatly prefer the Paris of the 1930s or of the 1950s to the Paris of the 1970s."

Still, the book is a kind of celebration. Pleasure is found in many quaint details that Cobb delights in pointing out. We find our attention riveted by the glassy leafage on an early 19th-century café window, a decorated communal tap, even a stairway: "One can *feel* the grooves of the well-worn stairs. . . ."

Cobb's eye doesn't miss much. His comments are given like sketches, deft and colorful. A woman glares at us from

the entrance to a café. "Not in fact a friendly gesture from a *Pernod*-ravaged face, accompanied by a flood of insults. The only occasion in fact when the camera was greeted with hostility." At a tidy shop with corked bottles on display, the shopkeeper, we learn, has a taste for his own products and is snoozing inside. Cobb records that "his breathing can be heard in the quiet courtyard."

Belleville-Ménilmontant is perhaps the most alluring place we discover. It is described as the dramatic *arrondissement*, the most Parisian, a true home of Paris speech, the highest part of the city and probably even the healthiest. Successive waves of immigrants—Russian and Polish Jews, Senegalese and Algerians—have swept through it, making it a stronghold of skilled artisans. Cobb is quick to inform us, however, that "traditional Belleville has not long to go." The property speculators have already moved in, the bulldozers are at work, and high-rises are breaking the sky.

For those who can still afford the cost of travel abroad, and who would avoid the tourist-ridden spots, *The Streets of Paris* will fill a gap. It is both entertaining and practical. And for those who cannot go, the book at least gives a different view of a distant city, romantic even in black and white.
—Ronald Varney
New York writer

Art & Money: an Irreverent History
Aubrey Menen
(McGraw-Hill, $11.95)

Russian Art and American Money, 1900-1940
Robert C. Williams
(Harvard, $17.50)

These two books share the two principal nouns in their titles and that's all they share. The first is not terribly "irreverent" and not at all a "history." It is an anecdotal assemblage of ancient rumors, stale gossip and documental extracts more or less to be believed. The second is a thoroughgoing scholarly investigation of a subject of much more significance because of larger mutual interests or antagonisms between the United States and the Soviet Union than those of either art or money.

It is Aubrey Menen's conceit that no one but himself has ever realized that

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artists are interested in being paid for their efforts, dealers still more so for theirs, collectors in paying for theirs and sometimes in profiting from them—in short, that in art no less than in enterprise, politics, love, social relations, what-you-will, there is and always has been a cash nexus.

If you have been brought up to believe that art exists in some sort of vacuum as far as cash is concerned, that artists and dealers are fed by birds and perform their functions of making and merchandising out of sheer love of color and line, and would consider it obscene to make a living, often a very good living, out of such activities, then you will be shocked by Menen's revelations. If, on the other hand, you were so reared as to believe most workers in the world expect to live off their efforts, whatever they are, you will not be.

The author flits through a series of links between famous artists and cash; they are occasionally amusing, more often dulled by his insistence on a kind of *trattoria* cynicism over the cash connection in art. It is an "irreverent" exposé of what most people already assume. It also contains a certain amount of sloppy checking and misspellings.

Professor Williams' book is almost free of flaws—he does call John Walker the "first" director of the National Gallery of Art; he was the second. His book is also free of the determined frivolity that plagues Menen's.

Williams' story begins in 1904, with the question: Whatever became of 600 paintings sent over in that year by the Imperial Russian government and exhibited in St. Louis? After sleuthing about through yellowing files around the country, Williams saw a larger story: the 40-year exchange of Russian art for American money, promoted actively by the Imperial, and later Soviet, governments.

Williams has chronicled in detail the exploits of the central characters in this exchange. Among them were avid collectors such as Katherine Dreier (pursuing Kandinsky, Malevich and other moderns); Marjorie Merriweather Post (married to Joseph Davies, ambassador to Russia in the 1930s), who lived like a queen surrounded by Fabergé Easter eggs from the Romanov treasure; and Andrew Mellon, whose historic purchases in 1930-31 of European masterpieces from the Hermitage were to stun the world. Colorful promoters popped up, like Nicholas Roerich, who sported Tibetan robes and whose New York museum was dubbed by the *New York Times* "The Museum of Natural Mystery." Even more interesting for his entrepreneurial exploits is Armand Hammer, go-between of governments, who went to Russia in 1921 to manufacture pencils and returned nine years later to sell Russian art treasures in department stores.

Throughout, Williams reminds us what was in it for the Russians, as Stalin and the others sought out capitalists eager to advance the cash for canvases to save the faltering Soviet system.

Williams is for those seriously interested in one fascinating aspect of American-Russian rivalry—or symbiosis. Menen's book is for the guest-room night table where it is unlikely more than a chapter will be read at a time.

—Frank Getlein
Washington critic and author

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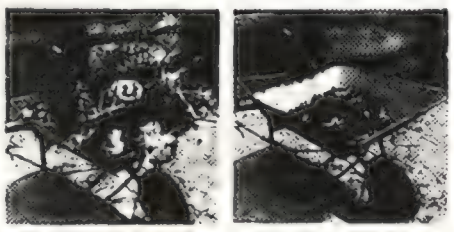

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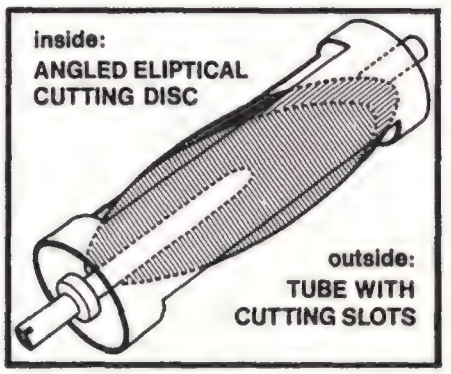

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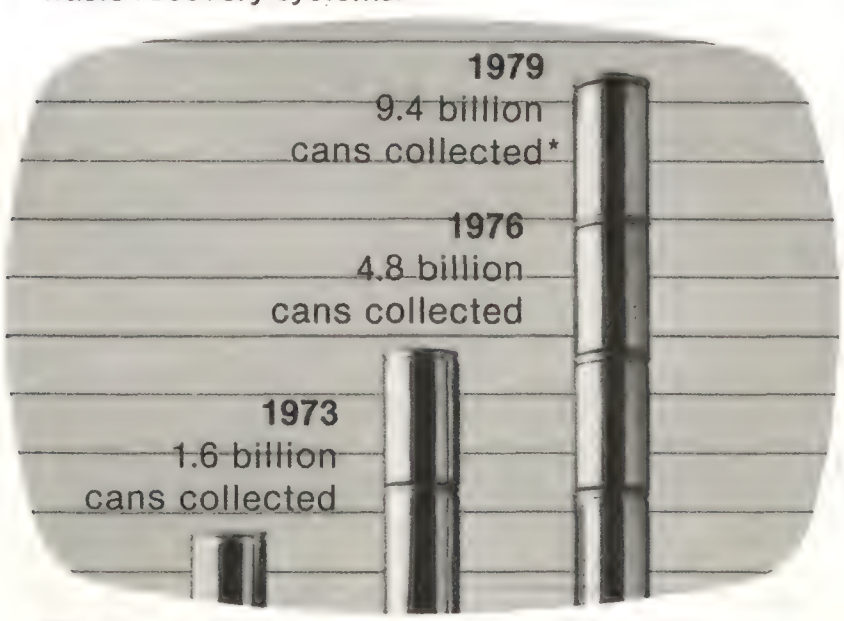

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*Alcoa estimate

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Additional reading

Air safety (p. 42)

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Strength Through Wisdom (A Report to the President from The President's Commission on Foreign Language and International Studies), November 1979; available from American Council on the Teaching of Foreign Languages, 2 Park Avenue, Room 1814, New York, New York 10016

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Daniel Chester French: An American Sculptor by Michael Richman, The Metropolitan Museum of Art (exhibition catalog), 1976

A report on the great American forest.

Money does grow on trees.

(And vice versa.)

Consider the wonderfully versatile American forest.

It provides all Americans with useful wood and paper products, recreation, natural beauty, protection for watersheds and wildlife.

But it goes even farther, making these less obvious, but no less important, contributions to the country's economic well-being:

Jobs — millions of workers in the woods, in the factories that turn wood and fiber into thousands of essential products, and on construction sites all over this growing land.

Taxes — billions of dollars a year, going to support schools, hospitals, public safety, countless other vital public services.

International trade — wood products we export help strengthen the American dollar and improve the nation's balance of payments.

Inflation deterrent — the more productive the forest, the more likely that the nation's supply of wood and paper products will be adequate to meet sharply increasing demands — and will be available at reasonable prices. Thus, a productive commercial forest, growing trees for today *and* tomorrow, becomes a significant inflation fighter.

Your stake in the commercial forest

So every American has a stake in increasing the productivity of the commercial forests. (*Commercial forest,* as defined by the U.S. Forest Service, is *all* forestland — whether owned by individuals, government or the forest industry — that is capable of, and potentially available for, growing repeated crops of trees for harvest. It includes land in National Forests but not in National Parks or Wilderness areas.)

So far, the commercial forest has been able to cope with all the demands made on it. But we can't expect it to continue to provide its benefits automatically.

Why trees need money too

If wood supply is to keep up with the predicted doubling of demand in this nation over the next 50 years, expenditures for replanting and regeneration will have to be substantially increased.

And the greatest potential for improvement is on publicly held land.

So that means the nation needs to establish policies and take actions to encourage productivity — not only in the National Forests but in other forests as well.

If you'd like to be better informed on how important it is to keep America's forests productive, write American Forest Institute, P.O. Box 873, Springfield, VA 22150 for a free booklet, "The Great American Forest."

The great American forest. Trees for tomorrow. And tomorrow. And all the tomorrows after that.

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Summer Benefits for Associates

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Your membership card always admits you to lavish luncheons and weekend breakfasts . . . but from April 1st through Labor Day you may enjoy evening dining too . . . at your private buffet in the National Museum of Natural History. No reservations are required.

You just can't appreciate the wonders of Washington on only toast and coffee . . . so get your weekend visit off to a good start with all the strawberry crepes and other taste-tempting treats you can eat.

Take a respite in the middle of a long day lingering over luncheon with friends.

Or relax and enjoy a unique opportunity for both delightful family dining and uncrowded museum-going any summer evening.

Whatever your pleasure is . . . come early, stay late . . . and take advantage of these summer membership benefits.

Breakfast (Constitution Avenue entrance before the museum opens) 9:00-11:00 (weekends only) $3.75 (children $2.50)
Luncheon and Weekend Brunch 11:00-4:00 $4.75 (children $3.50)
Dinner 4:30-7:30 $4.75 (children $3.50)

Commercial parking is available at the National Air and Space Museum on 7th Street—but early weekend mornings and every evening you can usually find a space right on the Mall. To assist in planning your Smithsonian visit, orientation services are provided at the Associates' Reception Center in the Castle from 10-4 daily.

We look forward to seeing you!

The Associates Court

Revolutionary bones (p. 119)

Ethan Allen, Frontier Rebel by Charles A. Jellison, Syracuse University Press, 1969

John Paul Jones by Samuel Eliot Morison, Little, Brown, 1959

John Paul Jones; Commemoration at Annapolis, April 24, 1906, compiled by Charles W. Stewart, Government Printing Office, 1907

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Arabian oryx (p. 130)

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Ed Link (p. 151)

The Pilot Maker by Lloyd L. Kelly as told to Robert B. Parks, Grosset & Dunlap, 1970

Windows in the Sea by Marion Clayton Link, Smithsonian Institution Press, 1973

"Edwin A. Link: A tribute to genius" by the staff of the *Binghamton* (New York) *Sun-Bulletin,* July 26, 1979

A New Theory on Columbus' Voyage through the Bahamas by Edwin A. and Marion C. Link, Smithsonian Miscellaneous Collections (Vol. 135, No. 4), Smithsonian Institution Press, 1958

Seeing isn't believing. Not anymore, it isn't.

In a world that wonders who and what to trust, nothing separates the media like believability. If you don't believe it, consider the findings of the Opinion Research Corporation's latest study. The fact is, 62% of the people rated magazine advertising believable. But only 39% of them said as much for television advertising.

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MPA

Smithsonian highlights

Fifties show at HM&SG includes Motherwell's *A Sculptor's Picture with Blue.*

In May the Hirshhorn Museum and Sculpture Garden takes a fresh look at the Fifties, a decade generally characterized as a heyday of abstract art (right). *The Fifties: Aspects of Painting in New York* begins with abstract expressionism and moves on to show parallel and later developments: "second generation" abstract expressionism, "hard edge" abstraction, color field painting, proto-pop and the many styles of figurative painting which persisted throughout the decade. The more than 30 artists represented in the show make up a Fifties "Who's Who," from Avery to Youngerman, with names like Lichtenstein, Pollock, Rothko and Stella in between.

A very special Smithsonian exhibit, the kind you can take home, is the exquisite catalogue raisonné recently published by Smithsonian Institution Press of the graphic works of impressionist artist Mary Cassatt (1844-1926).

The author is Adelyn Dohme Breeskin, consultant for 20th-century painting and sculpture at NCFA, whose interest in the Philadelphia-born artist began back in 1918. The volume provides a thorough look at her graphics (p. 174), especially "her incomparable renderings of the mother and child theme . . . in which the infant rests secure and deeply loved."

Special May events

Air and Space Museum
Human-Powered Flight: The "Gossamer" Aircraft (May 15, 7:30 P.M.)—Annual Grierson Memorial Lecture by Gossamer designer Paul B. MacCready.
Gossamer Films (May 16, 7:30 P.M.).
Birth of the Elements (May 14, 7:30 P.M.)—Nuclear physicist William Fowler discusses chemical elements of the universe.
The Sky Wanderers (May 3, 9 A.M.)—Monthly sky lecture features planets.

Hirshhorn Museum & Sculpture Garden
The Fifties: Aspects of Painting in New York (May 22-September 21)—A look at this important decade in art.
Alexandra Exter: Marionettes and Theatrical Designs (through July 6).
Miró: Selected Paintings (through June 8)—Major retrospective (SMITHSONIAN, April 1980).

Cooper-Hewitt Museum (New York)
Spectacular Spaces: Drawings from the Cooper-Hewitt Collection (through June 1)—Some unusual architectural designs.
Close Observation: Oil Sketches of Frederic Edwin Church (through July 27)—Works of this 19th-century landscapist.

Freer Gallery of Art
Chinese Calligraphy (May 9-November 10)—Some 30 examples of this treasured art form, including 12 rare scrolls exhibited for the first time since being acquired by Freer in 1979.
Korean Art—New exhibit of ceramics, metalwork and paintings.

Museum of African Art
Fon Appliquéd Textiles (through June 1)—Artifacts and textiles of the Fon people of the Republic of Benin.

Museum of History & Technology (MHT)
Nation's Attic (ends September 15)—Offbeat collection (SMITHSONIAN, April 1980).
Free Film Theater (Wednesdays, Thursdays, 12:30 P.M.)—One-hour films.

National Collection of Fine Arts
John R. Grabach: 70 Years an Artist (May 23-August 17)—Works show Ashcan-style, social protest paintings and contemporary urban landscapes.
Walter Quirt (through August 3).

National Portrait Gallery
American Portrait Drawings (May 1-August 3)—An exhibition of 95 portraits from 18th century to present day.
Jefferson Davis Portrait (through June)—Rare likeness painted in 1849 by miniaturist George Lethbridge Saunders.

Renwick Gallery
Costumes from the Arab World (May 2-July 27)—Distinctive collection includes dresses, daggers, vests and body veils.
Belgian Lace (May 16-November 11)—Skirts, parasols, collars and other samples.
Traditional Marionettes in French Belgium Today (through July 27).

Regional events

American folk music performances and talks on nature photography, monumental sculpture, orchids and the National Air and Space Museum will highlight the Smithsonian's educational program in St. Louis, May 11-19.

The program is cosponsored by local organizations. For information write: Regional Events, 1208 A&I, Smithsonian, Washington, D.C. 20560.

Some impressions never fade.

You start out wet behind the ears. Swallow some water. Do a few bellyflops. You keep trying. Again and again. And again. But there's a lot of people behind you. The coaches. Parents. And volunteers. As well as the Amateur Athletic Union. Helping you learn discipline. Gain confidence. And make friends. Each step of the way. Because swimming and diving are more than just time and form alone. And that's why Phillips Petroleum is a long-time sponsor of AAU swimming and most recently of AAU diving. It's a contest where everyone wins. Even though only a few earn medals. Or make it to the Olympics. Because what you learn sticks with you for the rest of your life.

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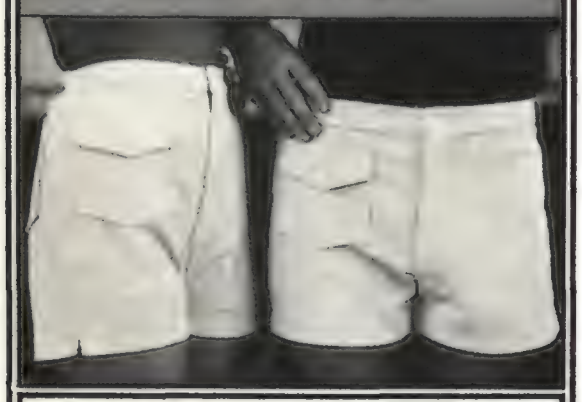

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Smithsonian events

Special events and performances in May are listed below. For tickets, call (A) 202-381-5157 or (B) 202-381-5395, as noted.
Discover Singing! (April 30-May 25, A&I Theater, Wednesdays-Sundays). (B)
Lessons From Vietnam (May 1, 8 P.M., MHT)—Discussion in cooperation with Woodrow Wilson Center for Scholars. (A)
American Musical Theater (May 2-4, 8 P.M., MNH)—Jerome Kern's music. (B)
Jazz Weekend—Free events including concert May 9, 8 P.M., MNH; rare films, May 10, 11, 6 P.M., MNH; tickets required. (B)
Mountain Gorilla Groups (May 12, 6 and 8:30 P.M., MNH)—Expert Dian Fossey discusses her work. (A)
Reusing America's Energy (May 14, 10 A.M.-5:30 P.M., MHT)—Symposium. (A)
Symphony in Black (May 17, 18, 6 P.M., MNH)—Works by Duke Ellington, some never before performed. (B)

Radio Smithsonian

This music and conversation program is broadcast weekly on approximately 65 stations across the country.
An Art of Parody?—an interview with Columbian artist Fernando Botero; *Local is Beautiful*—ways for cities to become energy self-sufficient (week of May 4).
Flying with the 99th—the story of Black pilots during World War II; *Rugs for Your Walls*—making Finnish "ryijy" rugs (week of May 11).
All About Edith—costume designer Edith Head talks about her career; *The Magic of Midas*—gold (week of May 18).
Let's Face It—highlights from the 1941 musical (week of May 25).

Smithsonian Institution Traveling Exhibition Service

SITES circulates exhibitions to hundreds of cities outside Washington, D.C. To sponsor a show in your community, write to Eileen Harakal, SITES, Smithsonian Institution, Washington, D.C. 20560. Here are some May exhibits:
Mobile, Alabama (May 10-June 8)—*Buildings Reborn: New Uses, Old Places,* The Museum of the City of Mobile.
Little Rock (May 24-June 22)—*The Art of Sri Lanka: Contemporary Works On Paper,* Arkansas Art Center.
Boulder, Colorado (May 3-June 1)—*American Drawings II,* IBM.
Athens, Georgia (May 17-June 15)—*Alvar Aalto,* University of Georgia.
Athens, Ohio (May 10-June 8)—*African Artists in America,* Trisolini Gallery.
Columbus, Ohio (May 17-June 15)—*Jacob Jordaens: Drawings and Prints,* Columbus Museum of Art.
Boston (May 17-August 3)—*The Year of the Hopi,* Boston Museum of Science.
Kansas City, Missouri (May 17-June 15)—*Buildings Reborn: New Uses, Old Places,* Liberty Memorial Museum.
Columbus, Texas (May 5-June 5)—*Folk Arts and Crafts: The Deep South,* Mansfield Library Building.
San Antonio (May 24-July 6)—*The Phillips Collection, In the Making: 1920-1930,* Marion Koogler McNay Art Institute.
Milwaukee (May 10-June 22)—*Sèvres Porcelain,* Milwaukee Public Museum.

Membership benefits when visiting the Smithsonian

The **Associates Reception Desk,** in the castle, is open 10 A.M.-4 P.M. daily for registration and information materials.

The **Associates Lounge** in the castle, a quiet place to relax, is open extended hours April 1 through Labor Day from 10 A.M. to 9 P.M. daily.

The Members' Dining Room, **"The Court,"** in the Museum of Natural History is open Monday-Friday, lunch (11 A.M.-4 P.M.) and dinner (4:30-7:30 P.M.); weekends, breakfast (9-11 A.M.), brunch (11 A.M.-4 P.M.), dinner (4:30-7:30 P.M.).

For previsit information, send postcard or phone Associates Reception Center, Smithsonian Institution, Washington, D.C. 20560 (202-381-6264 or TTY 202-381-4448). Allow two weeks for receipt.

Musical Weekend
For information about Smithsonian's Musical Weekend of concerts and tours, May 2-4, contact MHT Smithsonian, Room 4124, Washington, D.C. 20560 or (202) 381-4426.

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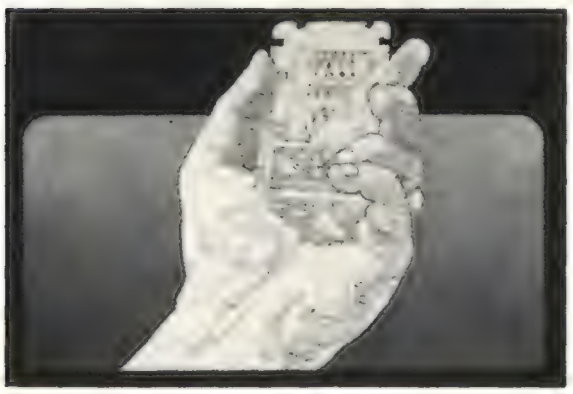

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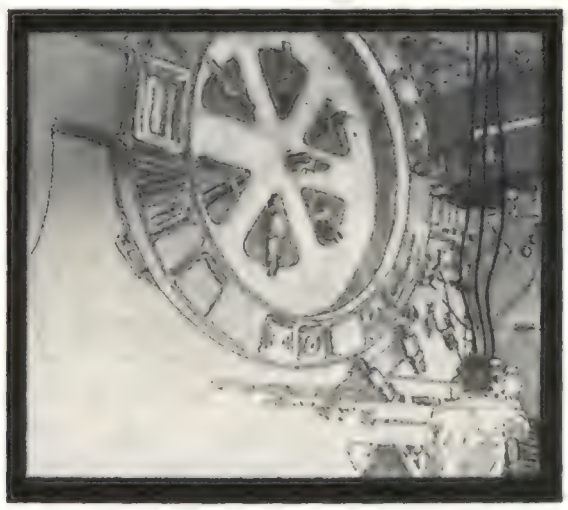

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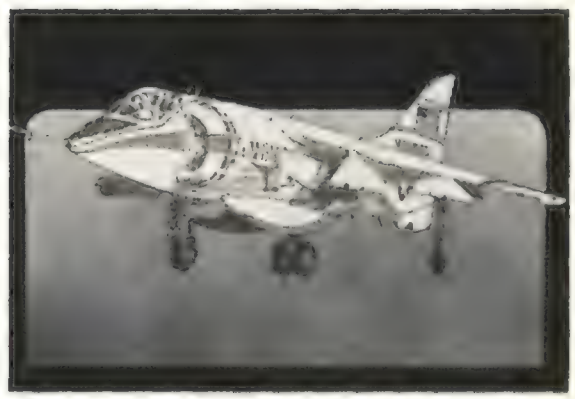

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Domestic Study Tours

These tours offer specialized guidance and expertise generally unavailable to persons traveling on their own:

Bryce/Zion—June 3-11: Study the geology and natural history of Utah's spectacular national parks.

Grand Tetons—June 1-11: An active outdoor program to explore the beautiful back country of this national park.

Desolation and Gray Canyons—July 22-August 1, September 30-October 11, or October 12-23: White-water trip for the adventurous; explore geology, wildlife and exciting Indian and outlaw history of Utah's Green River.

Collegiate Peaks of Colorado—July 26-August 3: Base camp nestled in alpine basin near Continental Divide provides ideal setting for environmental education.

Alaska—July 31-August 9: Enjoy the serenity of Mt. McKinley National Park at Camp Denali, a wilderness retreat.

Williamsburg Family Weekend—August 14-17: A repeat of our popular program for children 7-14 (and parents) to learn about 18th-century life through participation in Colonial activities.

Grand Canyon—August 14-24 or August 22-September 1: Exciting raft trip on the Colorado with emphasis on geology and natural history.

Chicago—September 17-21: Discover the architectural treasures of this vibrant city with tours and lectures by Chicago Architecture Foundation staff.

Hawaii—September 30-October 9: Study the natural history of the "big island" with its volcanoes and lush orchid gardens.

Coming in October: **California Wine**—tastings and talks; and **New England Seaports**—the history of America's China trade.

The Florida Keys: A Tropical Wilderness—November 2-9: An active program offers snorkeling and field trips to explore Big Pine Key and colorful coral reefs of the Gulf Stream.

Washington "Anytime" Weekend: Choose any weekend to visit your choice of Smithsonian museums, spend two nights at Loew's L'Enfant Plaza Hotel or Hyatt Regency Washington, each close to the Mall, and see other sights in the city by Tourmobile. Reservations and payments at least ten days prior to arrival.

Foreign Study Tours

These tours range in size from small group experiences to charter adventures and vary in price from low cost to deluxe, depending on the type of travel, destination visited and length of trip:

Russia*—May 18-June 1: Enjoy springtime in Leningrad, Tallinn and Moscow with a two-day excursion to Vladimir and Suzdal; see palaces, the Kremlin, the Hermitage among other museums; life-seeing visits to schools, factories and clinics.

London*—May 25-June 8: A full program in London with special lectures, walking tours, theater and excursions; a five-day travel seminar into the English countryside.

Island World of Britain—May 30-June 15: Gain a unique maritime perspective by circumnavigating the British Isles aboard the *Argonaut,* visiting well-known destinations and nine remote outer islands. Lectures and on-shore excursions explore prehistoric ruins and contemporary economic issues, great houses and village hamlets. A private farewell dinner at the Houses of Parliament concludes journey.

Montreal/Quebec—June 14-21: Enjoy the old-world charm of these Canadian cities while learning about their cultural history on walking tours and museum visits.

Iceland: Land of Fire and Ice—August 3-17: Travel a rugged terrain of glaciers, hot springs, fjords and waterfalls. Visit fishing and farming communities to meet today's pioneers of the far North.

Scandinavian Passage: Fjords and Capitals—August 8-23: From Bergen, Norway, cruise magnificent Nordfjord and Sognefjorden. Continue to Copenhagen and Visby, Sweden, then cruise the Baltic, calling in at Leningrad and Tallinn before returning to Stockholm. Learn about Scandinavia through activities ashore and on board the *World Discoverer.*

Oxford/Smithsonian Seminar—September 12-27: Participants live in Worcester College and select from curriculum taught by Oxford University faculty. Lectures, field trips and special seminars utilize rich resources of the town and university, the Ashmolean Museum and Bodleian Library.

Canadian Rockies—September 15-24: Snow-capped peaks, blue-green lakes and forested valleys provide scenic grandeur for hiking and studying the natural history of Banff, Lake Louise and Jasper.

Spain—September 14-28: Enjoy cosmopolitan Madrid and excursions to Toledo and Segovia. Then visit Andalusia, including Córdoba and Granada.

Adriatic Shores—September 19-October 5: From Athens, cruise both shores of the Adriatic Sea aboard the *Argonaut.* In Italy, visit churches, museums, palaces in Brindisi, Bari, Ravenna, Trieste and Venice. Explore walled cities of Dubrovnik and Split on Yugoslavia's Dalmatian coast, and the Greek Island of Corfu.

Paris & French Countryside*—September 21-October 5: Museum lectures and day excursions from Paris plus week-long travel to Alsace-Lorraine, Provence, or Normandy and Brittany.

The Land of Eire*—September 28-October 12: Circle tour of the Irish Republic includes in-depth visits to museums, medieval sites, and seminars on Irish history, architecture and folklore.

Kyoto Seminar—October 17-November 2: In this medieval capital, study language, art, history, religion and the development of modern Japan.

India Wildlife Safari—November 16-December 9: Visit sanctuaries in India and Nepal; observe magnificent bird and animal life of the sub-continent.

Antarctica—December 31, 1980-January 20, 1981: Prominent lecturers make this a rewarding expedition to a powerful continent. Cruise aboard the *World Discoverer* from Punta Arenas, Chile, to the Falkland Islands, then down to Antarctica.

* Indicates optional predeparture course.

Write National Associates, A&I 1278, Smithsonian Institution, Washington, D.C. 20560 for specific tour/seminar brochures or call (202)

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Selected Studies Seminars

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The Arts of Japan—May 18-23: Connoisseurs and renowned art historians offer richly illustrated lectures and tours of outstanding private and public collections, including the famous Freer Gallery of Art. Includes pottery, painting and sculpture from prehistory to now; architecture of temples, shrines, palaces and imperial tombs.

Genealogical Research—June 8-13: Leading authorities teach participants how to conduct research in the National Archives, Library of Congress and DAR Library.

Astronomy of the Ancients—June 15-20: Leading authorities and writers who are attracting widespread attention in the rapidly growing field of archaeoastronomy discuss the intriguing discoveries and hot debates concerning ancient peoples' sophisticated knowledge of the sky. Illustrated lectures include monumental Stonehenge; the Egyptian pyramids; the temples, cities and other impressive stone alignments of the Mayans; the methods of the skillful Incas and the early American Indians.

Coming in the fall:

Tibet: Lost Horizons—Sept. 28-Oct. 3: A cultural history of a uniquely rich civilization. Includes tours of the Freer Gallery of Art and the best private collection of Tibetan art in the U.S.

China: A Cultural History—Oct. 5-10

Historic House Preservation—Oct. 19-24

Aircraft Restoration—Oct. 26-30

Flemish and Dutch Painting in the 17th Century—Nov. 9-14; Masterworks by Rembrandt, Hals, Vermeer, Rubens, Van Dyck and others. Includes in-depth tours of the National Gallery of Art.

World War II Aircraft—Nov. 16-21

Genealogical Research—Nov. 16-21

381-5635 (tours) or 381-6434 (seminars).

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Marathon picnic outings on the beaches near the Cliff House have hurley-burled in popularity among the City's cyclists.

Wicker baskets heavily laden with Dungeness crab, oyster delicacies, champagne magnums and other sumptuous treats are the hallmark of numerous velocipede-powered suitors.

Passing by one cozy couple, a misty-eyed girl commented, "You've broken the promise you made me." To which, the agile-minded beau brummel replied, "Never mind, my dear, I'll make you another."

There was a time, a golden city and Korbel

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By Dorothy Brazier

Uncle BJ, who penned that really golden prose

As who doesn't know, today's new gold rush has had many people—my friends, like yours—running around the house searching for old fillings, spectacle frames, divorced wedding rings and other jewelry. They reel with the pleasant shock of what they get paid for those golden oldies, if they find any.

All the to-do about gold (SMITHSONIAN, February 1980) has brought to mind, for the first time in years, my Uncle BJ and his letters from Alaska, where he had been prospecting long after the Klondike came and went.

"Dear Dorothy:" he would begin, and the colon was actually two little round dots of real gold, pasted to the paper. For all of his punctuation the thoughtful old dear did the same, using small nuggets with tails for commas and long, slender ones for exclamation points.

Once he enclosed a necklace of baby gold nuggets that I didn't like—what I had wanted was a big, chunky necklace of fat pearls to wear with a cashmere sweater. Not *real* pearls, but big ones.

As I picked the tiny nuggets out of the folds of skin on my neck and the folds of fuzz on the sweater, I had no way of knowing that by 1980 women, and some men, too, would be wearing thin gold chains. Or that the string of crude nuggets would have become a conversation piece and made me the envy of the new breed of gold rushers.

One winter when I was seven or so a gold-flecked letter arrived from Uncle BJ announcing he was coming "outside." There was great excitement as we all piled into my father's car and headed for the waterfront to meet him.

What a winter that was! BJ came with a full poke and he was bent on spending its contents. My four French uncles looked down their long noses at such profligacy. But for years and years Uncle BJ had been far from city lights, and while Seattle was no great metropolis then, it offered good restaurants, movie theaters (which he was seeing for the first time), touring shows and a number of famous concert artists.

Eating in restaurants every night had never been our family custom, and my mother began to be homesick for her kitchen range. It made little difference that Emma Calvé, Dame Nellie Melba and Madame Ernestine Schumann-Heink were unknown to the nonmusical members of the family. Uncle BJ bought tickets to all their concerts and herded every one of his relatives to hear them, like it or not.

He also would walk the streets of Seattle, looking for old Alaska friends, and when he found someone he had known well or casually—even someone who probably had trouble recalling Uncle BJ—he would propel him into a movie house. "This is a great picture," he would say, as he advanced on the box office, "I've seen it seven times."

And then his poke was empty and he was off to his cabin in Nome or Ruby, his stay with us a fine memory for him and for me. We had become good friends, and after his return to the North he wrote me as regularly as he did his own daughter, my cousin. The difference was that she got the letters with the checks and I got the ones with the nuggets. The angular scrawls told of his dogs, his partner, the weather, and always ended with: "I'm going to make it rich this year!" (With a nugget as exclamation point.)

This went on for years; then he and his money descended on us again. By then I was playing the piano quite well, and we went to music stores to pick out records for Uncle BJ to take back to his phonograph in his lonely cabin. He returned to Alaska with his bundle of operatic arias, and then the letters stopped. Maybe he got too busy panning gold and making it rich.

He came "outside" once more. His daughter and I were both married by then. I took him to concerts and operas to repay the pleasures of the past, but by then his joy in going places and doing things was waning. He had come down to Seattle to die.

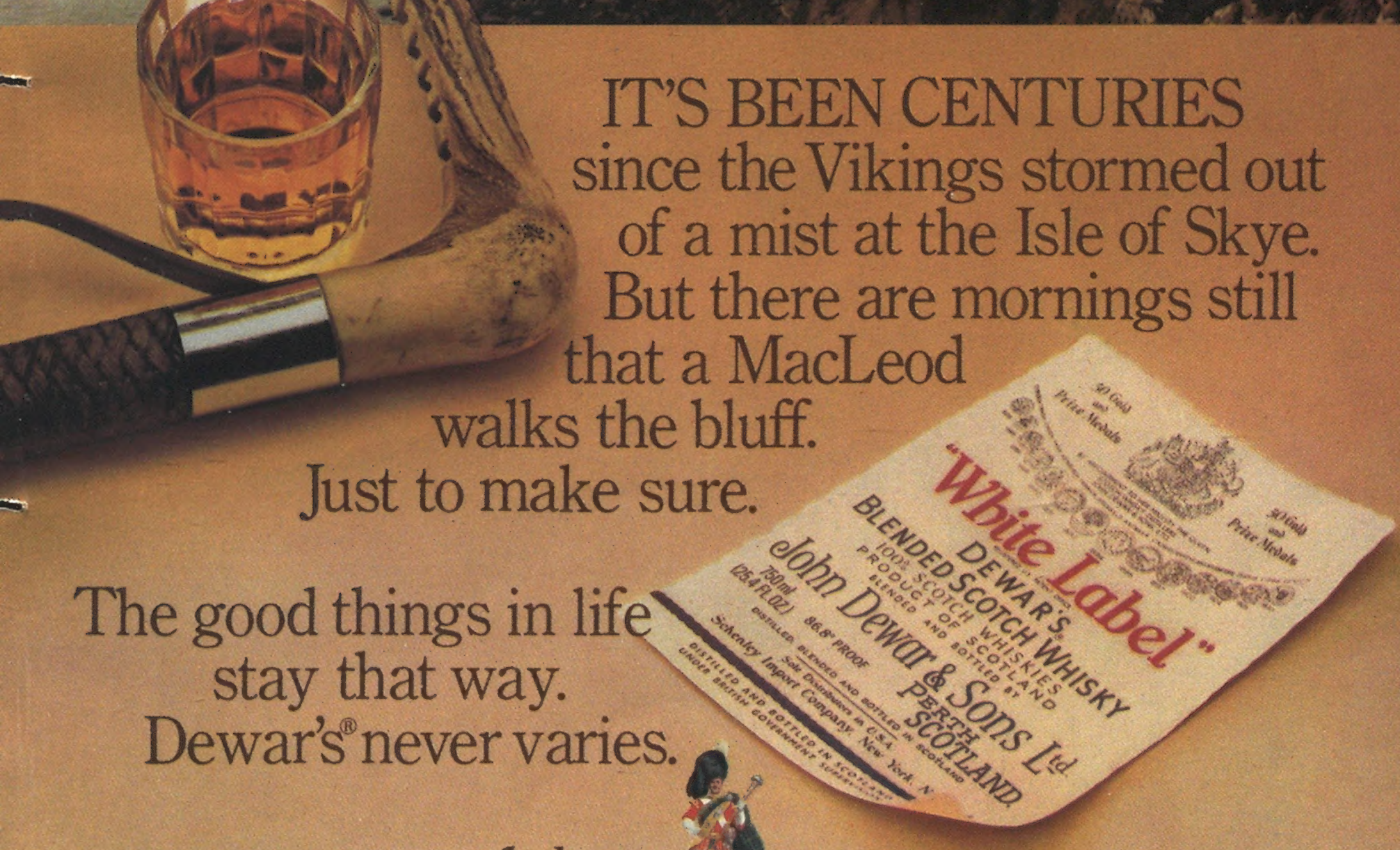
He was buried in Seattle's pioneer cemetery. The day of his funeral and burial I realized I had never known what the "BJ" stood for. There it was, inscribed on the headstone: "BIGGER J. BOWER, 1867-1949."

Bigger J., bigger than life. That was our Uncle BJ. Overlooking his simple marker, flush with the ground, was a memorial from an earlier, more flamboyant day, but also bigger than life: a tall shaft surmounted by the stone figure of a miner and his dog.

I am glad, though, that Uncle BJ never asked me what had become of all those punctuation-mark nuggets. Oh, I'd saved them, all right, along with the necklace. But during the Depression, when I was having trouble making it in college, I had sold them at an assay office.

They brought me just $16.

IT'S BEEN CENTURIES since the Vikings stormed out of a mist at the Isle of Skye. But there are mornings still that a MacLeod walks the bluff. Just to make sure.



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